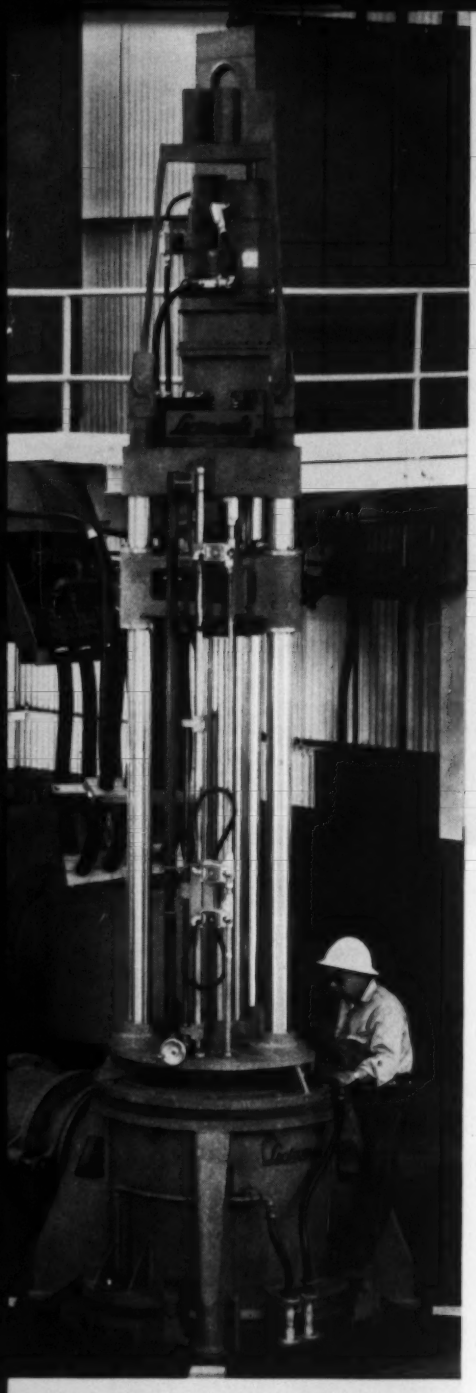


STEEL

The Metalworking Weekly

NOVEMBER 7, 1960

A PENTON PUBLICATION

Impact of Machine Tool Exposition—Show Goers Hike '61 Buying Plans

Electroshaping Bids for Big Role In Machining Tough Metals

Paring of Metal Stocks Continues

Vacuum Steels Meet Demand for Quality

Demand for high quality steels will increase in the sixties. Consumable electrode, vacuum arc furnaces like this one should become more popular in steelmaking. And similar gains should be made by other vacuum processing equipment. For further information, see Page 106

MATERIALS EFFICIENCY

How to Slash Scrap Costs

No. 23 in STEEL's Program for Management

CONTENTS—TURN PAGE

TO

MINIMIZE PRODUCTION COSTS

SPECIFY

B&W *Job-Matched seamless mechanical tubing*

Only through B&W can you get . . .

- such a wide selection of tubing from which to choose
- unbiased assistance in the choice of the type of tube for a given application

Service is only one of the many reasons why it pays to specify B&W Seamless Mechanical Tubing. And remember matching tubes to jobs assures you of ease of fabrication and a better product at optimum low unit cost. For more information call your local B&W District Sales Office or write for Bulletin TB-361. B&W Mechanical Tubing is also available through a nationwide network of independent Steel Service Centers. The Babcock & Wilcox Company, Tubular Products Division, Beaver Falls, Pennsylvania.

Steel

B&W

THE BABCOCK & WILCOX COMPANY

TUBULAR PRODUCTS DIVISION

TA-9048-SM2

Seamless and welded tubular products, solid extrusions, seamless welding fittings and forged steel flanges—in carbon, alloy and stainless steels and special metals

This Week in STEEL

The Metalworking Weekly

November 7, 1960 Vol. 147 No. 19

Machine Tool Show Goers Hike '61 Buying Plans

Two-thirds of respondents in a STEEL survey of metalworking executives who attended The Machine Tool Exposition—1960 say they plan to spend more in 1961 for machine tools than they will this year. PAGE 71

Construction Outlook for '61: Up

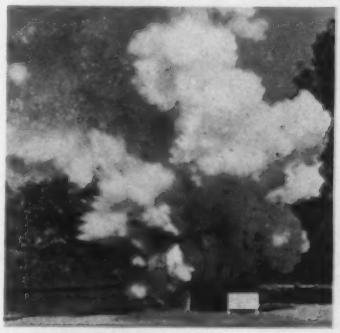
James M. Straub, president, Fort Pitt Bridge Works, Pittsburgh, is the new president of American Institute of Steel Construction Inc. He and his fellow steel fabricators expect a modest upturn in shipments in 1961. Their optimism is shared by the Associated General Contractors of America in the outlook for all construction next year. The forecast: New construction will total $57.2 million vs. $55 million this year. Maintenance and repair will add another $19.5 million vs. $19 million in 1960. Areas adding the most strength include housing, industrial, utility, and highway construction. PAGE 72

Materials Efficiency—How to Slash Scrap Costs

You can cut scrap losses many ways, but these stand out: 1. Redesign the part. 2. Make it by a different method. 3. Reduce the number of bad parts. PAGE 81

Welded Cryogenic Steel Takes Impact, Pressure

Stress relief after welding isn't necessary for safe, economical transportation and storage of liquefied gases in vessels made of a quenched and tempered 9 per cent nickel steel. That was demonstrated in a program conducted jointly by three firms; U. S. Steel Corp., International Nickel Co. Inc., and Chicago Bridge & Iron Co. In one test, a vessel filled with liquid nitrogen ripped open (photo) but did not shatter at −320° F under a load about six times design stress. PAGE 108



Electroshaping: New Approach to Chipless Machining

A new electrolytic machining process, called Sifco Shaping, is said to be potentially capable of duplicating all of the common metal shaping operations in use today. PAGE 110

More Paring of Metal Stocks Ahead

Metal buyers responding to a STEEL survey indicate they will continue inventory reductions through the first quarter of 1961 despite a slight, though less than seasonal upturn in business. PAGE 139

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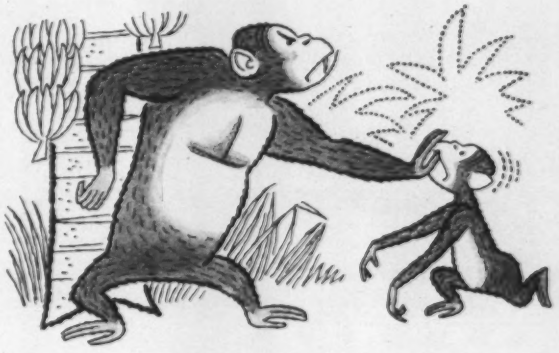
The Chimp who turned out to be a Chump

Once, in a far-off tropic land, there lived a chimpanzee named Charlie. His home was a banana tree.

And you'll have to admit, that's a pretty shrewd place for a chimp to live.

One day Charlie spotted a huge bunch of ripe bananas, washed up on the beach by the incoming tide. He rushed from his tree and spent the next few weeks living a life of ease.

All too soon the treasure was gone. Not only that, but Charlie found that his old tree had been taken over by an ape with large teeth and a nasty disposition. So now Charlie squats sadly on the shore. He peers anxiously towards the waves, waiting in vain for another treasure on another tide.



Whether your needs be bananas or steel, your safest, most reliable suppliers are right here at home. Remember, no one knows the needs of American steel buyers better than American steel makers. To serve you, and serve you well, is our primary concern—not just today and tomorrow—but year after year.

Isn't it reassuring to know the steel you buy is made by old and proven friends? It's steel of certified analysis, meeting appropriate specifications. You can rely on Bethlehem Steel for a wide range of standard and specialty products. And remember, our engineers are on call to help you solve your steel-working problems.

Isn't it time to place an order for your next steel requirement with Bethlehem?

Steel *for Strength . . . Economy . . . Versatility*

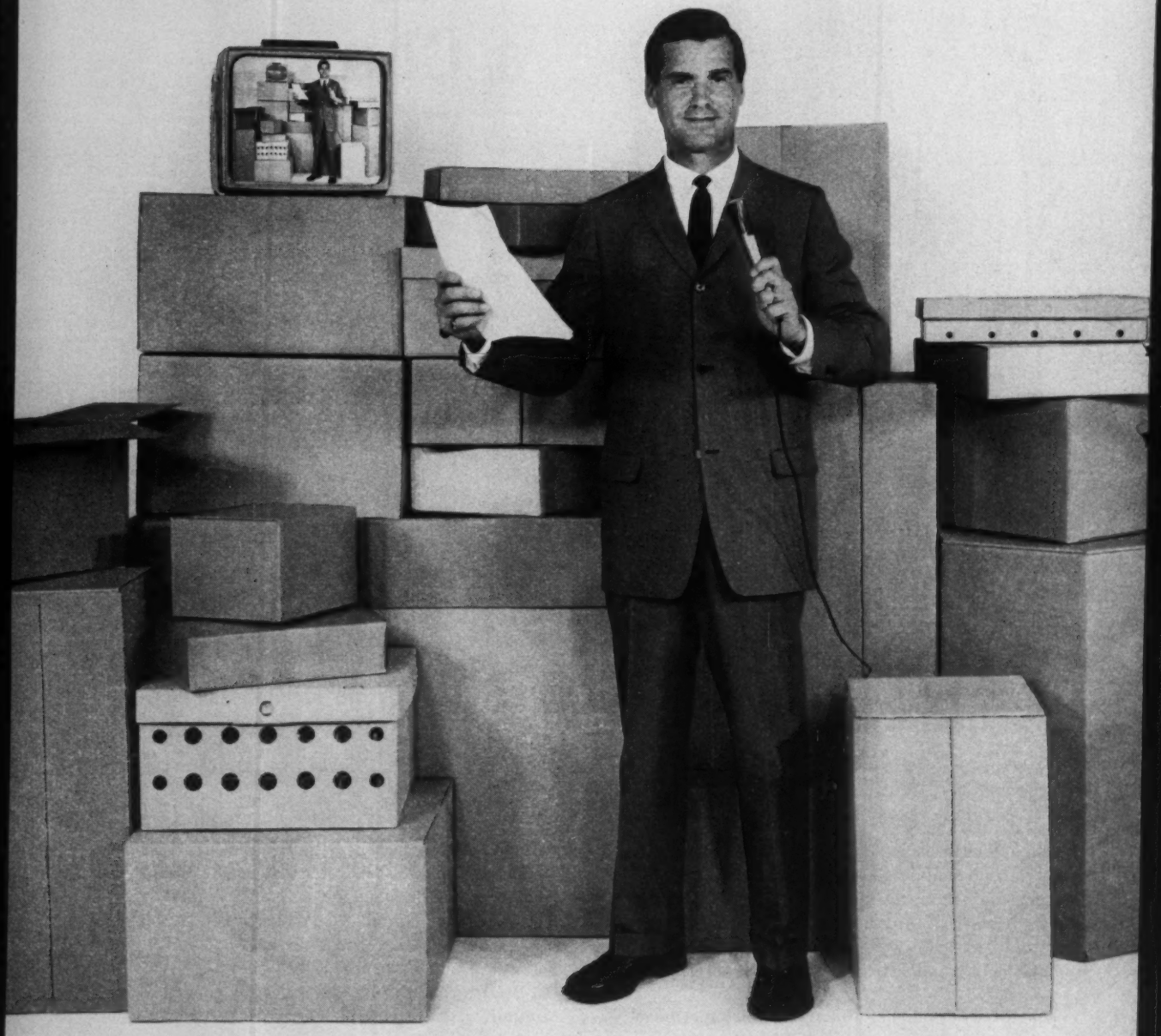
BETHLEHEM STEEL

BETHLEHEM STEEL COMPANY, BETHLEHEM, PA.

BETHLEHEM STEEL

GAYLORD'S PACKAGING SERVICE GIVES YOU PERFECT RECEPTION

You're never in a fringe area when you buy Gaylord boxes. Sixteen plants assure you of prompt delivery, on your signal, in any frequency to fit your packaging program. Have your nearby Gaylord Man look in, and give you a quick rundown.



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GAYLORD CONTAINER DIVISION

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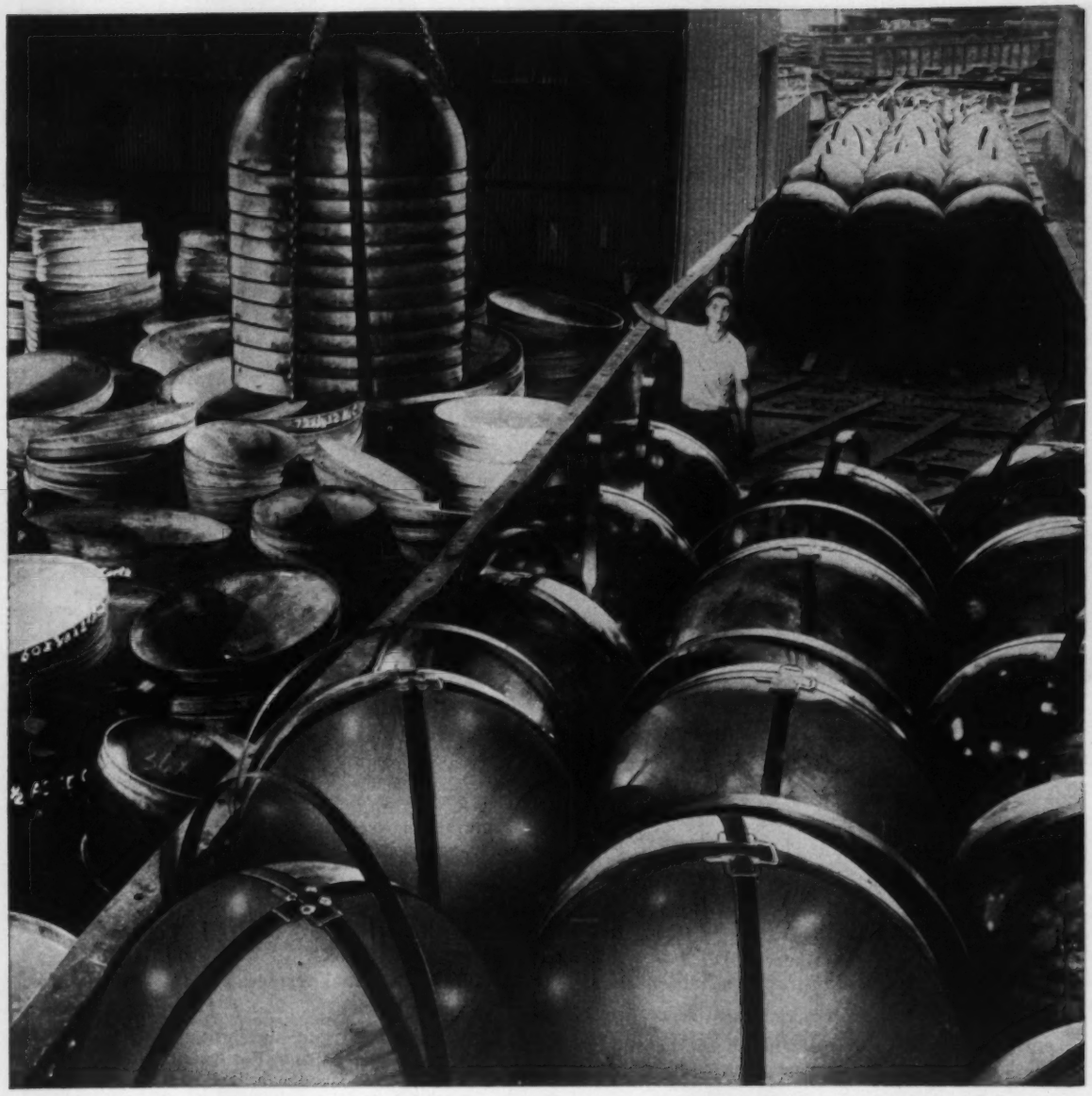


Get fast delivery—order COMMERCIAL heads

COMMERCIAL tank heads, cold formed in steel dies, are more accurate than spun heads, yet actually cost you less. That's because their consistent uniformity makes fitting-up easier . . . welding faster. And, you get this advantage in every size and style—in fact, in every single head . . . just one or a whole carload.

For fast delivery, COMMERCIAL offers heads from stock made with a complete range of solid dies in all standard sizes from 12" to 72" O.D. . . . in all popular gauges up to ½" thickness. Heads can be furnished for code or non-code pressure vessel construction from steels to meet the required specifications. Types furnished include flanged-and-dished, ellipsoidal, hemispherical, flanged only, double dished and obround.

With over 30 years experience and ingenuity in cold forming of steel, COMMERCIAL produces heads with improved metal quality in presses up to 2000-ton capacity. Three plants—Youngstown, Chicago, Salt Lake City—strategically located in important steel producing centers, are keyed to expedite your order.

For full information on heads in stock for immediate delivery, write to Commercial Shearing & Stamping Company, Dept. L-46, Youngstown 1, Ohio.

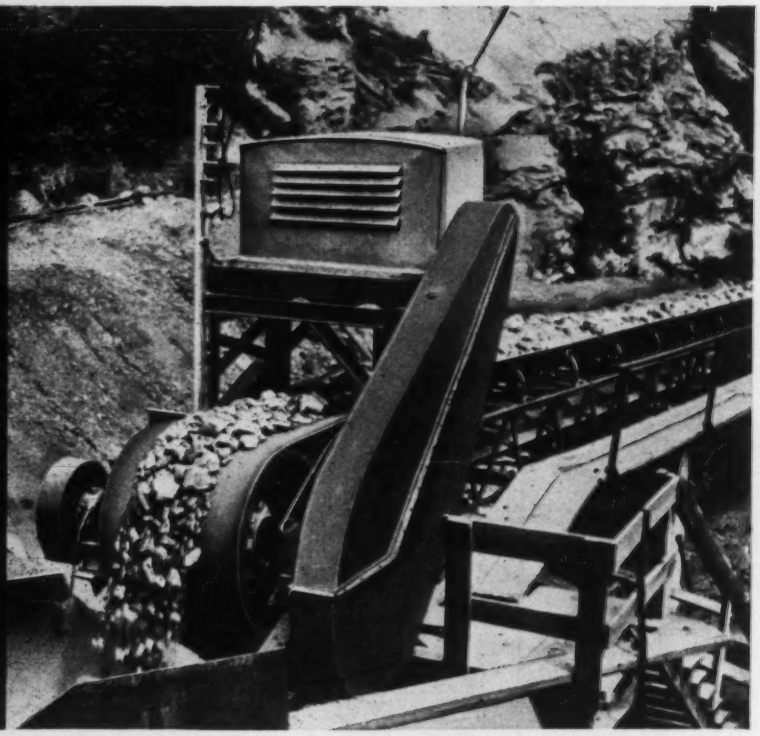
Specialists in the shape of things to come

COMMERCIAL shearing & stamping

GOODYEAR

Now...
to remake belting
history..

NEW
INDUSTRIAL
UNIFLO



...the conveyor belting built for the belt-killers

This is it! New Industrial UNIFLO is the *first* woven-carcass rubber belting specifically designed to make history in hard-rock mining, quarrying, steel mills, pulp mills, foundries and the like.

New Industrial UNIFLO construction is available in a variety of compounds and gauges—including heat- and oil-resistant types. And extensive tests—underground and above-ground alike—have proved its superior capabilities under the toughest operating conditions.

To be specific, UNIFLO construction has . . .

. . . **proved** its unparalleled resistance to internal rupture caused by trapped material or pulley build-up

. . . **proved** its tear-resistance 3 times as great as comparable synthetic fabric-reinforced belts—10 times as great as comparable cotton-reinforced belts

. . . **proved** its excellent impact-resistance

. . . **proved** its unusually fine cover adhesion and cut-resistance

. . . **proved** its outstanding troughability and trainability

. . . **proved** its exceptional edgewear resistance

. . . **proved** its top-rank fastener-retention—handling wet or dry materials

But these are only the highlights of the great new Industrial UNIFLO Belting. For complete details, check with the G.T.M. – Goodyear Technical Man – through your Goodyear Distributor. Or write Goodyear, Industrial Products Division, Akron 16, Ohio.

GOODYEAR INDUSTRIAL PRODUCTS

GTM-Specified

Industrial UNIFLO conveyor belting for severe above-ground service

A Seamless, tough covers in a full range of compounds and thicknesses for superior protection against cuts, abrasion, heat and oil

B Single unit carcass of high-tensile, interwoven yarn bonded to the cover under high pressure to give you exceptional strength and fastener-holding qualities — good troughability and trainability

Lots of good things
come from

GOODYEAR

INDUSTRIAL PRODUCTS

Goodyear-T.M. The Goodyear Tire & Rubber Company, Akron, Ohio

Looking For Graduates?

How many college graduates will your company need this year? Of those you need, how many will you get? A lot depends upon the effectiveness of your company's employment recruiting program.

Detroit Resident Editor Don Postma has interviewed corporate recruiters and surveyed college placement directors to determine what trends you can expect. In his story next week, you'll find out what errors recruiters make, what suggestions placement directors have for recruiters, whether liberal arts, science, or business graduates are in greater demand.

One leading university got student and recruiter opinions on interview practices and found that potential employees resent gimmicks. Here's one bittersweet example.

Whetting an Appetite

When one student walked into an interview room, a sales recruiter tossed a cigaret lighter to him and breezily challenged: "Sell it to me."

The student promptly gave a cigaret to the recruiter, took one for himself. He lighted his own, but not the recruiter's.

The recruiter finally asked for a light and the interviewee, arms akimbo, replied: "Whatever I have to offer, I have to get money for. You can buy this lighter from me now, or get it back from the placement director on your way out." With a deft air, the student then proceeded to extoll the attributes of the lighter and stressed how handy it was to have a light when one needed it.

Result: Recruiter bought lighter back and student got job.

Training Purchasers

R. E. Betterley, training supervisor, Training & Research Institute, American Foundrymen's Society, Des Plaines, Ill., writes: "The Sept. 12 Materials Efficiency article, 'Use Your Suppliers' Brainpower,' made excellent instructional material for our course entitled, 'Economical Purchasing of Foundry Materials.' Thank you for your assistance."

The Box Score

So far, 836 readers have requested reprints of the Production Efficiency articles, 612 of them have asked for the set of 13 installments. The Materials Efficiency Series (see Table of Contents) has drawn 228 letters; 186 readers are receiving copies of each article.

Usership Winner Collects $1000

Inspecting the result of a $1000 idea is J. W. Wilcock, division manager, Sturtevant Div., Westinghouse Electric Corp., Hyde Park, Mass. Mr. Wilcock won $500 in June and is the third person to collect a full $1000 in STEEL's Usership Idea of the Month contests.

The fan he is touching was given a ceramic coating, a process he had read about in STEEL's Mirrors of Motordom column, "Ceramic Prolongs Muffler Life" (June 6, p. 69). Because of his reading and followthrough, Westinghouse expects to pioneer one of the first simplifications in fan corrosion protection in many years.

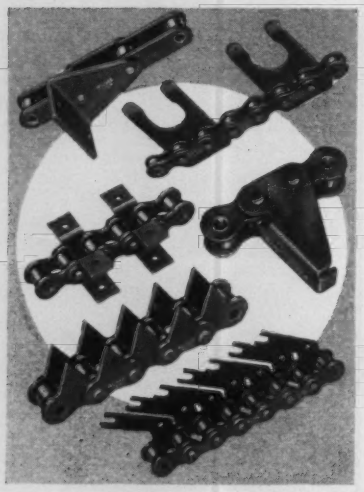
Here's what Mr. Wilcock had to say by way of proving attainment of his objective.

"Our first two commercially ceramic coated fans will go into operation in the near future. They are slated for industrial application under corrosive conditions. A new fan design, now in development, will incorporate ceramic coating to the further advantage of industrial users.

"It is indicated that we can downgrade the metal now used, and through ceramic coatings,

ACME'S CONVEYOR ATTACHMENTS

INCREASE PRODUCTION and LOWER COST



These are just a few of many conveyor attachments designed by ACME Engineers. They were made for greater speed and durability on automatic machinery... they give smoother running performance . . . greater speed and higher production. ACME chains are available in a complete range of sizes from ¼" pitch to 2½" pitch. Investigate the many advantages that ACME Conveyor Chains and Attachments offer you.

Call your local Industrial Distributor. He has the full cooperation of our Engineering Department.

Write Dept.10-T for new 100-page Illustrated Catalog, including new engineering section showing diagrams of 36 methods of chain driving.

Acme Chain Corporation
HOLYOKE MASSACHUSETTS

still provide adequate protection. In many cases, we can also reduce our costs of handling and preparation by eliminating use of other special coatings. If anticipated reductions in manufacturing costs are realized, we should be able to provide coated fans for severe corrosive conditions at some additional savings to users.

"We are currently gathering information about everything ceramic coatings will do for the user. We believe we have adequately proved the value and savings in the use of these coatings and now must put our sales and technical data together . . ."

The judges' unanimous decision to award Mr. Wilcock the second $500, means a total of $5000 has been given to STEEL readers who have used articles or advertisements to attain important personal or company objectives.

How about you? Have you entered?

You Can Win $1000 This Month . . .

. . . in STEEL's Usership Idea of the Month Contest. Tell us, in 300 words or less, how you plan to USE an article or advertisement in this issue (or any other issue published this month—November, 1960) to help you accomplish an important personal or company objective. Be as specific as you can. If in the opinion of the judges, yours is the best idea submitted—**you will win $500.**

There's more . . . you will win an additional $500 if you furnish written proof that you accomplished your objective. Proof must be submitted within six months after you are declared winner of STEEL's Usership Idea of the Month Award.

Please identify your letters as Usership entries. They will be judged by a committee of STEEL's editors. All letters become STEEL's property.

You can enter as many times as you wish. Send your entries to me, Ed Service, Servicenter, STEEL, 1213 W. Third St., Cleveland 13, Ohio. **Deadline for this month's contest is Jan. 1.**

Our 1960 Metal Selector . . .

. . . is high on STEEL's best seller list. Metallurgists, purchasing agents, engineers, designers, buyers, sellers, and others, accounted for 1000 copies of the Selector going out within one week after it was published. (See STEEL, Oct. 10, p. 125.)

H. E. Shoufler, assistant purchasing agent, Canning Machinery Div., Food Machinery & Chemical Corp., Hoopeston, Ill. wrote: "Again, you have done an excellent job on preparing the Selector. It is good to know that people like yourselves are working constantly to keep everyone up to date on materials. Keep up the good work."

Another example of National Roll quality control

Jack Russell, National's foundry superintendent, discusses an electric furnace heat with Bill Mason of the sales department.

Your steel rolls are custom-melted

National's electric furnace facilities for steel roll production are among the most modern in the industry. Furnace sizes, molding facilities, annealing equipment; all have been selected to provide the close metallurgical control needed at every step to produce high quality rolls that give long tonnage life.

This custom service extends to every roll order produced by National, whether steel, nodular iron, or iron. Since rolls are our only business, every phase of our operations is staffed with men who know *their* business, and how it affects *yours*.

We'd like to have you meet some of these men. The best way is to plan a visit to our modern plant at Avonmore. But if time prohibits this, let us send you a brochure that will tell you more about why . . .

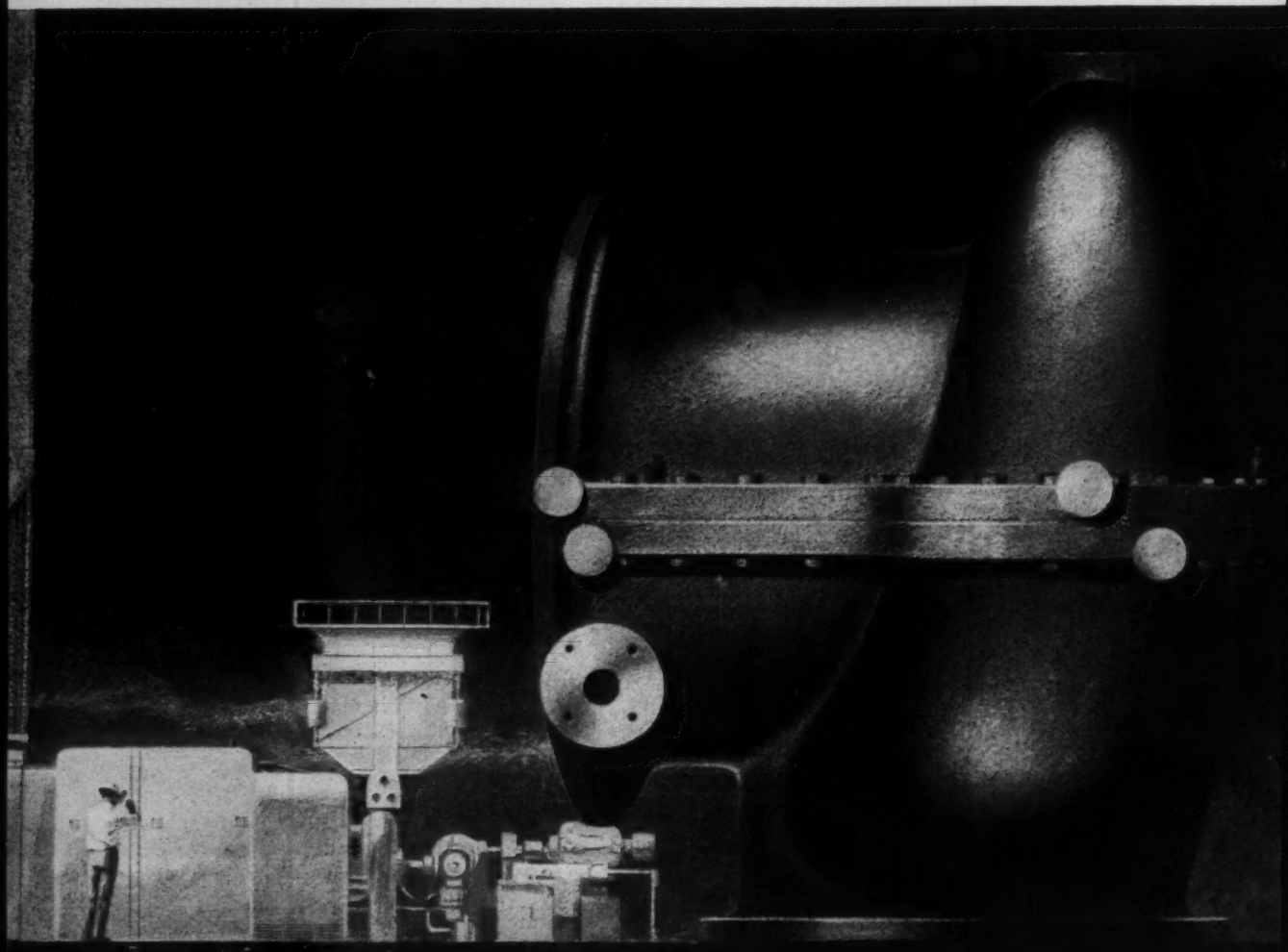
National's the growing name in rolls

NATIONAL ROLL & FOUNDRY DIVISION

GENERAL STEEL CASTINGS CORPORATION, Avonmore (Westmoreland County), Pa.

General Steel Castings Corporation, General Offices: Granite City, Illinois • Plants: Granite City, Ill., Eddystone, Pa., Avonmore, Pa.

How the Foundry Industry Serves America . . . #8 of a Series



IRON CASTING EFFECTS 4-WAY SAVING OVER WELDMENT

Substitution of high strength gray iron in this compressor discharge casing resulted in an important 4-way saving: 38% saving in weight, 58% saving in material cost, 25% saving in manufacturing time, and 34% saving in machining cost, as well as a considerable saving in shipping costs.

Originally the casing was made as a cast-weldment. It was redesigned, however, to take advantage of the fluidity of molten cast iron and its low shrinkage during solidification. These characteristics permit successful gray iron castings to be designed in shapes which are impossible with other materials or processes.

Because the iron could be placed exactly where needed, it was not necessary to build up the weight of the part by the use of fastening devices, welding or multiple pieces. Neither did it require costly machining.

This is factual proof that modern iron castings can deliver outstanding performance and impressive economies when specified by industrial designers.

For the production of structurally sound and economical iron castings, Hanna Furnace provides foundries with all regular grades of pig iron . . . including foundry, Bessemer, intermediate and low phosphorous, as well as HANNATITE® and Hanna Silvery.

Facts from files of Gray Iron Founders' Society, Inc.

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THE BEST KNOWN NAME IN IRON

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Buffalo • Detroit • New York • Philadelphia

Hanna Furnace is a division of **NATIONAL STEEL CORPORATION**

Quality . . . the best economy of all

Electronic parts courtesy Judson Mfg. Co., Inc., Cornwells Heights, Pa.

Mirror-bright without polishing, after switch to Sunicut

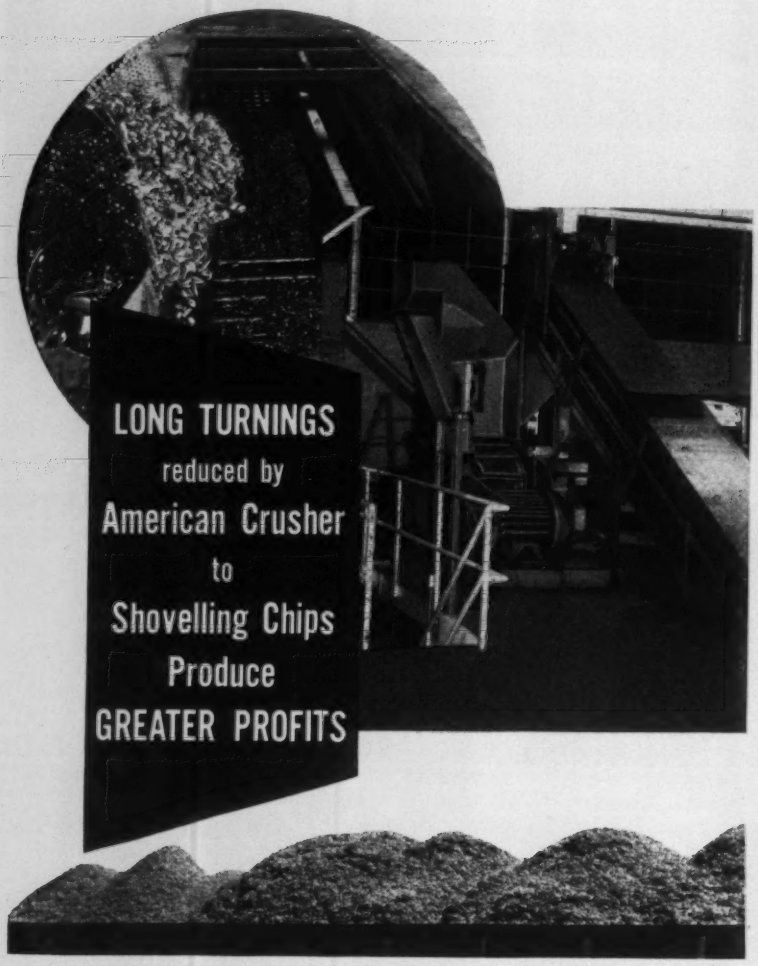
Boring on a multiple-spindle automatic produced the finish you see on these electronic parts. Sunicut 102-S Cutting Oil saved time and money by eliminating the polishing operation. The same automatic uses Sunicut 102-S to machine metals ranging from titanium to stainless 410.

Sunicut 102-S is one of a full line of cutting oils known throughout metalworking for maintaining long tool life, close tolerances, and fine finishes. There's a grade of Sunicut that can help you improve your product quality—and *that's* the best economy of all.

To choose the right Sunicut, ask the Sun man; that's part of his service to you. Or write to SUN OIL COMPANY, Dept. S-11, *Philadelphia 3, Pa. In Canada: Sun Oil Company Limited, Toronto and Montreal.*

SUNOCO

MAKERS OF FAMOUS CUSTOM-BLENDED BLUE SUNOCO GASOLINES



American Metal Turnings Crusher

. . . increases profits . . . improves handling

An almost fully automatic chip salvage system, with an American Metal Turnings Crusher at its heart has increased profits, saved space, and improved housekeeping at a ball bearing plant, conveyors service two rows of automatic screw machines and feed a cross-over conveyor. The cross-over conveyor feeds turnings directly into an American Metal Turnings Crusher which reduces the turnings to uniform sized chips. From the crusher chips are conveyed to a hopper to be periodically discharged into a chip-wringer to reclaim cutting oil. Dry chips drop into a discharge hopper and feed into an air duct which pneumatically conveys the chips to a storage bin at the rail siding.

Literature on American Metal Turnings Crushers is yours for the asking.

American **PULVERIZER COMPANY**

ORIGINATORS AND MANUFACTURERS OF RING CRUSHERS AND PULVERIZERS

1539 MACKLIND AVE. ST. LOUIS 10, MO.

CALENDAR
OF MEETINGS

Nov. 13-15, Institute of Scrap Iron & Steel Inc.: Joint Pacific Coast Conference of ISIS and the National Association of Secondary Materials Industries, Beverly Hilton Hotel, Los Angeles. Institute's address: 1729 H St. N. W., Washington 6, D. C. Assistant executive vice president: William S. Story.

Nov. 14-17, Wire Association: Annual meeting, LaSalle Hotel, Chicago. Association's address: 453 Main St., Stamford, Conn. Executive secretary: Richard E. Brown.

Nov. 14-18, American Society of Tool Engineers: Western tool show, Memorial Sports Arena and Ambassador Hotel, Los Angeles. Society's address: 10700 Puritan Ave., Detroit 38, Mich. Executive secretary: Harry E. Conrad.

Nov. 14-18, National Electrical Manufacturers Association: Annual meeting, Traymore Hotel, Atlantic City, N. J. Association's address: 155 E. 44th St., New York 17, N. Y. Managing director: Joseph F. Miller.

Nov. 17, National Industrial Conference Board Inc.: General session for all associates, Penn-Sheraton Hotel, Pittsburgh. Board's address: 460 Park Ave., New York 22, N. Y. Secretary: Herbert S. Briggs.

Nov. 17-30, Air Conditioning & Refrigeration Institute: Annual meeting, Hollywood Beach Hotel, Hollywood Beach, Fla. Institute's address: 1346 Connecticut Ave. N.W., Washington, D. C. Managing director: George S. Jones Jr.

Nov. 27-Dec. 2, American Society of Mechanical Engineers: Annual meeting, Statler-Hilton Hotel, New York. Society's address: 29 W. 39th St., New York 18, N. Y. Secretary: O. B. Schier.

Nov. 28-Dec. 2, Exposition of Power & Mechanical Engineering: Coliseum, New York. Information: International Exposition Co., 480 Lexington Ave., New York 17, N. Y.

Nov. 29-Dec. 1, Electronic Industries Association: Winter meeting, Fairmont Hotel, San Francisco. Association's address: 1721 DeSales St. N.W., Washington 6, D. C. Secretary: James D. Secrest.

Nov. 30-Dec. 2, Metallurgical Society of AIME: Electric furnace conference, Morrison Hotel, Chicago. Society's address: 29 W. 39th St., New York 18, N. Y. Secretary: R. W. Shearman.

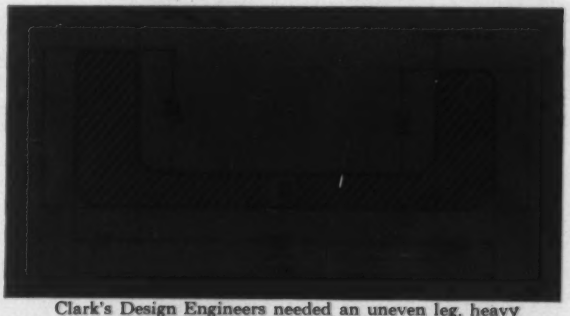
CONNORS

Clark Ranger-700 Lifts Truck Trailer Load of New Cars — New Truck Can Lift 35 Tons.

"This Connors Special Section makes our upright the best built upright in the industry," says John G. Mack, Vice President of Purchasing, Clark Equipment Company.

"Connors special rolled steel sections permitted us to improve our design and provide an upright with just the proper weight distribution for the ultimate in strength," notes Mr. Mack.

"By utilizing these special, high quality sections, we have given our customers the best design with better wearing qualities and have also expedited our assembly, thereby increasing production efficiency."



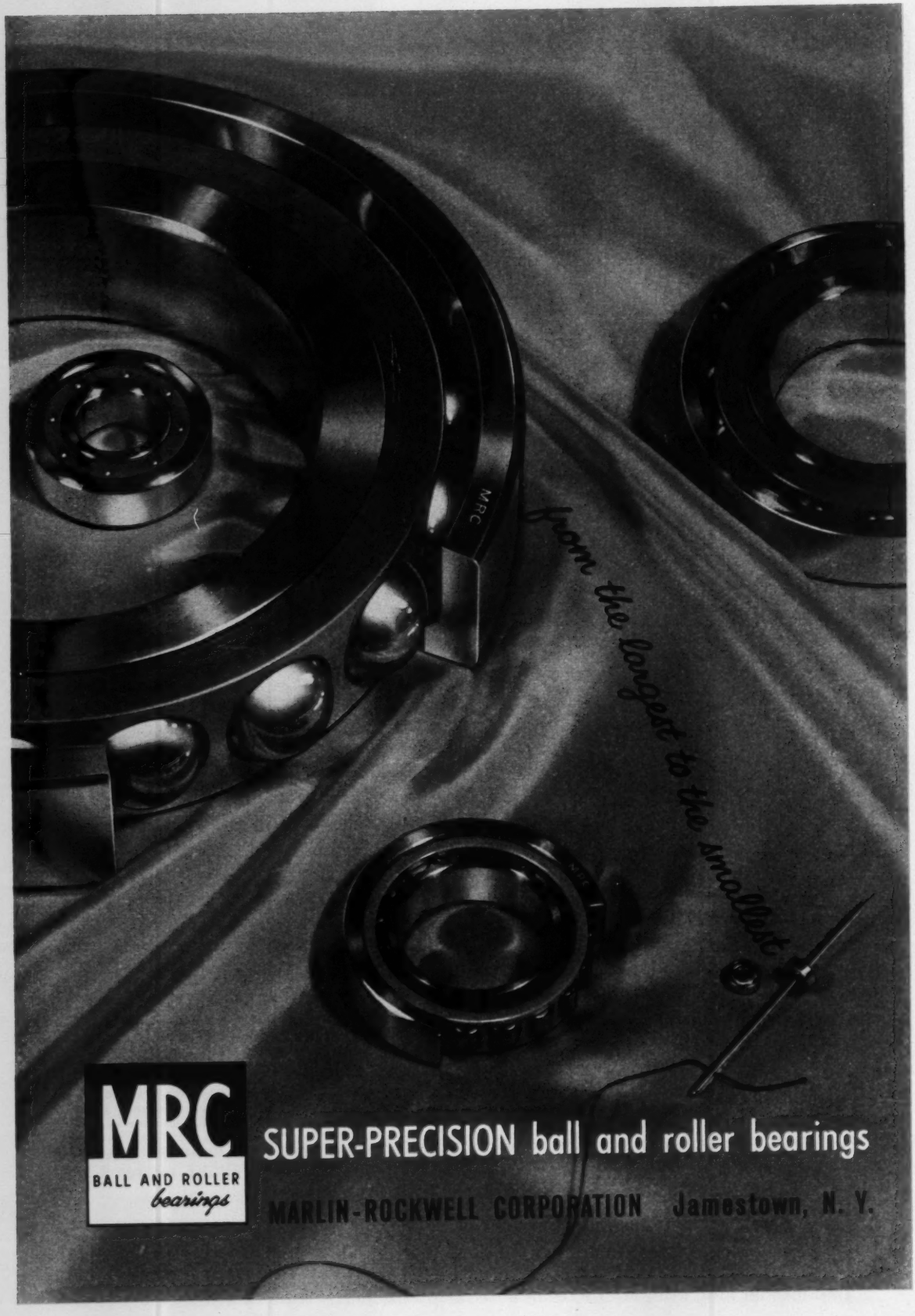
Clark's Design Engineers needed an uneven leg, heavy channel section to work in conjunction with an "I" beam section in their lift truck mast assembly. Connors produced and hot rolled a special section designed to meet their rigid specifications — providing proper weight distribution and the ultimate in strength.

Investigate the advantages of special sections.

For illustrated brochure or consultation write or call Connors — Specialists in Special Sections
CONNORS STEEL DIVISION, P. O. BOX 118D, HUNTINGTON, WEST VIRGINIA • PHONE JAckson 9-7171

CONNORS STEEL DIVISION **PORTER** ***H.K. PORTER COMPANY, INC.***

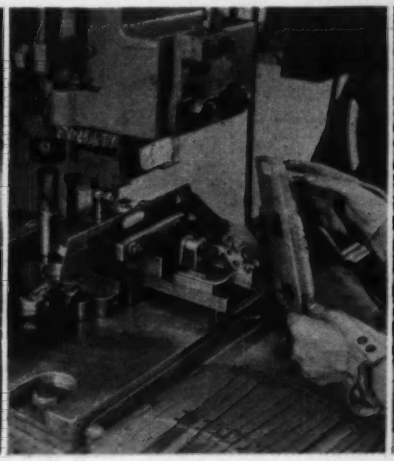
PORTER SERVES INDUSTRY with steel, rubber and friction products, asbestos textiles, high voltage electrical equipment, electrical wire and cable, wiring systems, motors, fans, blowers, specialty alloys, paints, refractories, tools, forgings and pipe fittings, roll formings and stampings, wire rope and strand.


MRC
from the largest to the smallest
MRC
BALL AND ROLLER
bearings
SUPER-PRECISION ball and roller bearings
MARLIN-ROCKWELL CORPORATION Jamestown, N. Y.

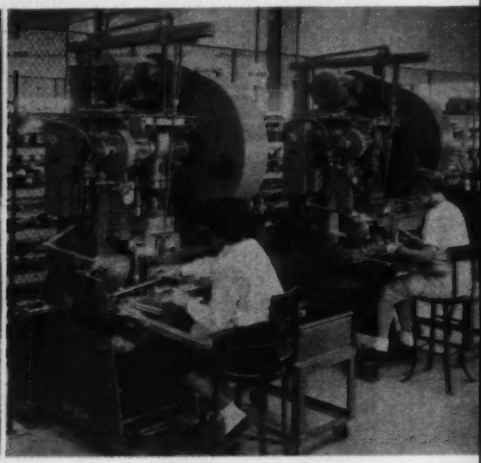
39 OBI'S GIVE PRESS DOLLARS 3-WAY STRETCH

Newly installed Niagara Inclinables provide required precision at lower investment, produce more parts per hour, and cut maintenance to the bone

SERVING ONE OF THE WORLD'S LARGEST typewriter manufacturers in a brand-new plant, 39 new Niagara Series A Open Back Inclinables play a key role in the production of nearly 2000 precision parts for portable machines. With selection based on past experience, these presses are more than living up to expectations . . . performance-wise and dollar-wise.

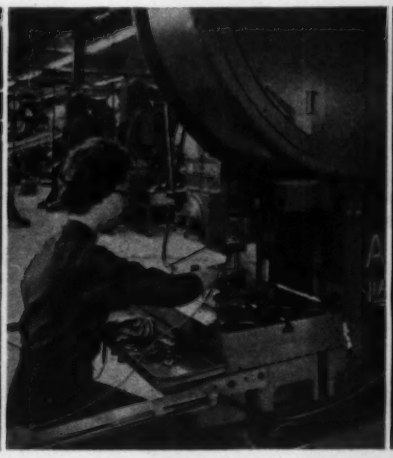


.001" TOLERANCES ARE MAINTAINED as Niagara OBI's engage in a wide variety of piercing, notching, trimming, bending and intricate forming operations. Here, a hinge tab is given a final bend on a 22-ton Niagara Series A. Rigid press frames and short-coupled, multiple "V" gibs not only insure precise production, but lengthen die life.



BOOSTING PRODUCTION 30%, these fast-acting hand fed OBI's turn out an average of 1300 pieces an hour per machine. The reason: Instant clutch engagement and disengagement at every press stroke provide more working strokes per minute. Niagara's famed multi-point mechanical sleeve clutch picks up the load on 14 engaging jaws and applies driving force concentrically without keys or pins.

EVERYTHING HUMS ALONG SMOOTHLY day after day. Niagara OBI's are unmatched for dependability and safety. With fewer parts and simpler construction, there's less to go wrong... less to repair and replace. No complicated electrical circuits, limit switches or solenoids... no palm buttons, air valves or rotary connections.



MAINTENANCE IS SHAVED TO AN "ABSOLUTE MINIMUM" according to this Niagara user. Unlike other presses previously utilized, these Series A's do not require constant "doctoring." There's no need for frequent adjustment of the clutch sleeve and brake. No "dogs" to break off and require replacement. No press can match its economy.

WANT TO STRETCH YOUR PRESS DOLLARS, TOO? Write for illustrated Bulletin 58 containing the facts and figures on Niagara Series A Open Back Inclinable Presses (built in 13 standard sizes with shaft diameters from 1¼" to 6½" and capacities from 5½ to 190 tons). *Niagara Machine & Tool Works, Buffalo 11, N. Y., District Offices and Distributors Everywhere.*

NIAGARA OBI PRESSES

America's most complete line of presses, press brakes, shears, other machines and tools for plate and sheet metal work.

From Norton... Higher Speeds for Faster Grinding ...Cylindrical or Surface

For your cylindrical grinding

. . . Norton brings you cylindrical grinders which provide a new higher wheel speed of 8500 SFPM. In test after test Norton Machines using "high-speed" Norton wheels have proved their ability to operate at this new high speed — safely, steadily and with production advantages never obtained before.

These Norton cylindrical production grinders — now called the Series 8500, and so identified with a name plate — include the Type CTU Cylindricals, Angular Wheel-Slide grinders, No. 2 Centerless and the Type CP-1 PLUNG-O-MATIC®. Similarly, Norton high-speed wheels have been tested and approved for 8500 SFPM and carry the new checkered-flag stencil.

Remember: *it took a great deal more than stepping up spindle speeds to assure the greater productivity of Series 8500 machines.*

Fluctuations in wheel energy, mechanical energy, tangential force and many other factors had to be carefully considered before final approval of designs.

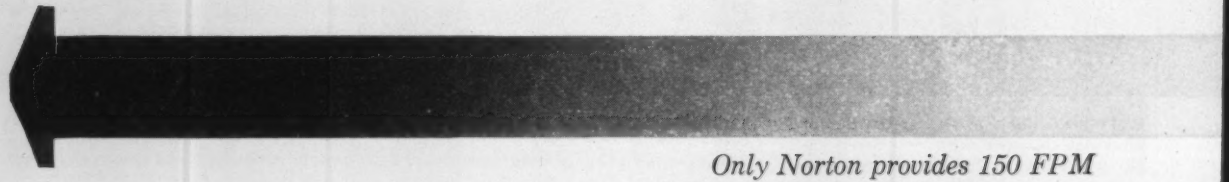
As a result, Series 8500 grinders produce more pieces-per-hour at lower cost-per-piece . . . provide finer finishes for improved product quality . . . and their higher speed reduces wheel dressings for longer wheel life and lowered wheel cost.

For your surface grinding

. . . Norton Type S-3 hydraulic surface grinders are now available with table speeds stepped up to a new high of 150 FPM.

This is another Norton achievement to bring you faster production than ever before. And, like the Series 8500, the Type S-3's are engineered to provide better production and product quality as a benefit of higher table speed.

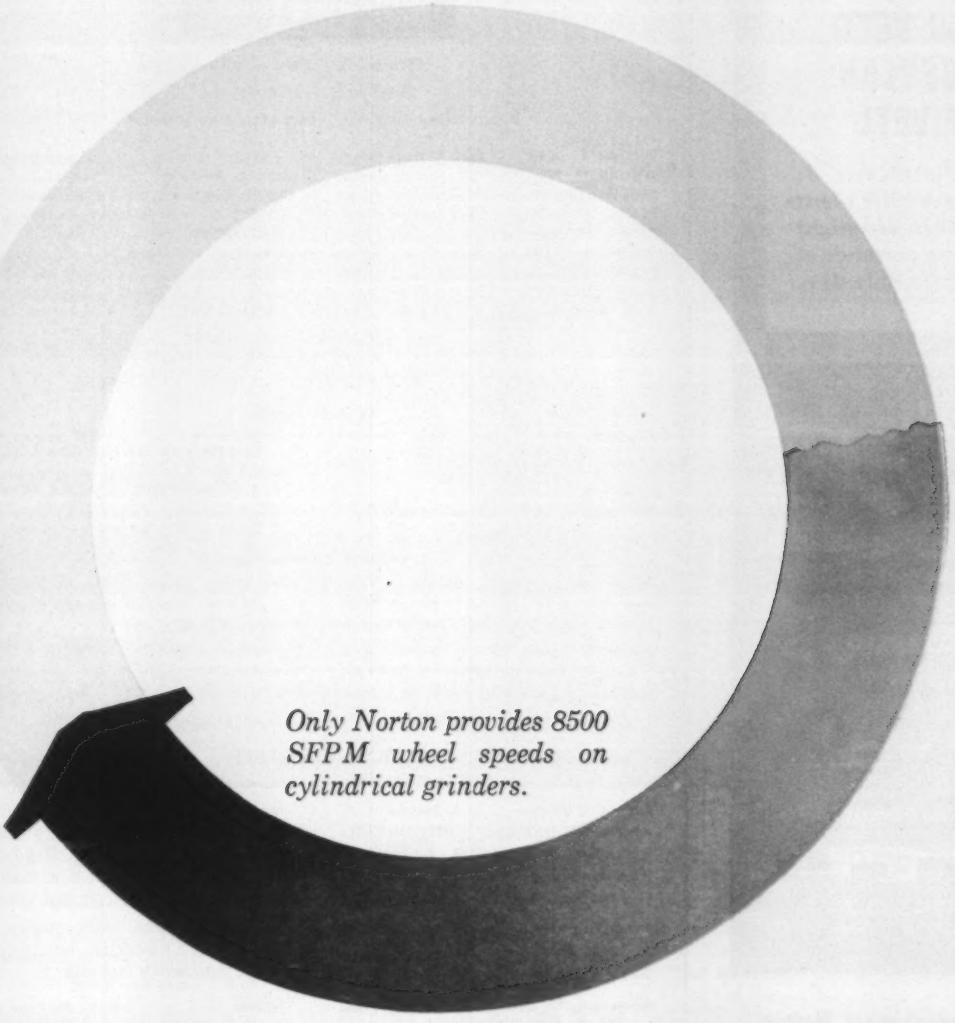
Available in 6″ x 18″ and 8″ x 24″ sizes, Type S-3 surface grinders are fast and accurate on long production runs or toolroom grinding. They handle taller workpieces . . . are equipped for fast positioning, better sighting and loading . . . and their faster table speeds mean less heat damage to workpieces.



Only Norton provides 150 FPM table speeds on surface grinders.

Learn how Norton developments are bringing more and more advantages of the speed age to many types of grinding. And call your Norton Man — a trained Grinding Engineer — for details on how these advantages can be brought to your own production. Or write to NORTON COMPANY, Machine Tool Division, Worcester 6, Massachusetts.

District Offices: Worcester, Hartford, Cleveland, Chicago, Detroit. *In Canada:* J. H. Ryder Machinery Co., Ltd., Toronto 5.



NORTON
MACHINE TOOLS

75 years of... Making better products
...to make your products better

NORTON PRODUCTS: Abrasives • Grinding Wheels • Machine Tools • Refractories • Electro-Chemicals — **BEHR-MANNING DIVISION:** Coated Abrasives • Sharpening Stones • Pressure-Sensitive Tapes
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WHEN YOU NEED TUBULAR RIVETS

Milford's five manufacturing plants are within overnight trucking distance of your assembly line

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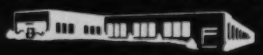

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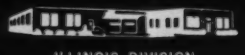

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Rivets can create "king-size" headaches when they aren't at your assembly line in the quantity you need—when you need them.

To give you unmatched delivery service on tubular rivets, Milford has five manufacturing plants and twenty sales offices strategically located across the country's industrial beltline. To cut delivery time and production costs, to improve product appearance, to assemble your product on automatic rivet-setting machines—get in touch with Milford.

THE MILFORD RIVET & MACHINE CO.

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"T-1" Steel saves 289 tons of weight in 16 lock gates

This is a story about how the tremendous strength of USS "T-1" Steel was utilized to save 289 tons of weight in the lock gates at the new Greenup, Kentucky and Markland, Indiana locks and dams on the Ohio River. Each lock gate has five diagonal braces that were designed for USS "T-1" Constructional Alloy Steel. At Greenup, it was estimated that 64 tons of "T-1" Steel did the work of 213 tons of carbon steel in eight gates. At Markland, 60 tons of "T-1" Steel were used instead of 200 tons of carbon steel to do the same job.

The diagonal units provide the supports which are absolutely essential to brace the gates. Each diagonal is a flat bar 8 inches wide by 1½ inches thick and about 73 feet long and weighs around 3,200 pounds. Toward the center of the diagonal is a turnbuckle used to adjust tension. By using USS "T-1" Steel, which has a minimum yield strength of 100,000 psi, both the size and weight of the diagonals were greatly reduced while retaining an ample factor of safety.

Lower costs. Reduction in weight because of the use of USS "T-1" Steel meant lower overall material costs, reduced shipping costs by more than one third, and decreased handling and erection costs.

USS "T-1" Steel for hoists. Four hoists for the emergency gates at Greenup locks and dam were also built of USS "T-1" Steel by McNally Pittsburg Mfg. Co., Pittsburg, Kansas. The structures are girder sections about 25 feet long and 41 inches deep. Flanges are 20 inches wide by 2½ inches thick. The webs are 36 inches deep by 1¼ inches thick. All were fabricated from "T-1" Steel plates. Each girder weighs about 12,000 pounds.

The new locks and dam on the Ohio River at Greenup, Kentucky were built under supervision of Huntington, W. Va. District, U. S. Army Corps of Engineers. A similar set of locks at Markland, Indiana was built under the Louisville District, U. S. Army Corps of Engineers. Gates fabricated by Nashville Bridge Company.

Other uses of USS "T-1" Steel in construction. Wherever great strength is needed with least weight, such as in bridges, TV towers, pressure vessels, and high pressure penstocks, USS "T-1" Steel offers many advantages. And for big construction machinery, "T-1" Steel is unsurpassed because of its strength, high resistance to impact abrasion, and weldability. For complete information, write for our "T-1" book. United States Steel, 525 William Penn Place, Pittsburgh 30, Pa.

USS and "T-1" are registered trademarks

United States Steel Corporation – Pittsburgh
Columbia-Geneva Steel – San Francisco
National Tube – Pittsburgh
Tennessee Coal & Iron – Fairfield, Alabama
United States Steel Supply – Steel Service Centers
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United States Steel

This mark tells you a product is made of modern, dependable Steel.

Down go back-up roll costs with

USS Quality Forged Sleeves

PICTURED ABOVE is James S. Rennick, a metallurgist with twenty years' experience in the Forgings Division of U. S. Steel. Jim specifies composition, heat treatment, and other processing procedures essential to the production of assemblies as shown in the main picture—a back-up roll that will be used in the cold reduction tin mill at U. S. Steel's Gary, Indiana plant.

This job points up a curious situation: U. S. Steel is one of the country's leading manufacturers of rolls, and also one of the biggest *users* of rolls . . . a double reason to perfect their performance and reduce their cost . . . just as we did here.

We had to replace a worn, cast steel back-up roll. Rather than replace the entire roll, we machined the face of the roll and shrunk on a *forged* steel sleeve. For back-up rolls like this one, 42" O.D. and larger, this method of sleeving is much less expensive than buying a complete new roll. One arbor can be used for several forged sleeves. A forged sleeve has a hard, wear-resistant surface and is highly resistant to spalling.

Also, the sleeve is purposely produced with a softer bore to develop a desirable stress pattern, and to provide maximum gripping between the arbor and sleeve after assembly.

There is a good possibility that we can help reduce *your* roll costs. Write or call the United States Steel Office nearest you, or United States Steel, 525 William Penn Place, Pittsburgh 30, Pennsylvania.

USS is a registered trademark

United States Steel Corporation—Pittsburgh
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United States Steel Export Company

United States Steel

Universal Engineer Tractor

(Steel bulldozer that flies)

"What we want is an earthmover that can do the work of conventional scrapers, dozers, and tractors . . . but which weighs only half as much . . . can be parachuted into a combat area, or flown in by helicopter!"

Army ballastable all-purpose tractor, manufactured for Barnes & Reinecke, Inc., by Hendrickson Manufacturing Company, Lyons, Illinois, is built light enough to be transported by air through the use of USS MAN-TEN High-Strength Steel and USS "T-1" Constructional Alloy Steel.

That was the demand made of the U. S. Army Engineer Center, Ft. Belvoir, Va. It was fulfilled through ingenious design using welded USS MAN-TEN High-Strength Steel and super-strength USS "T-1" Constructional Alloy Steel.

The ballastable all-purpose tractor weighs approximately 16,000 lbs. empty; 32,000 lbs. loaded. The weight reduction problem was solved by designers from Barnes & Reinecke, Inc., Chicago engineers. They designed the tractor in three sections—front end, scraper bowl and rear end.

The scraper's yoke, bowl frame, apron ejector, bowl skin and drawbar were welded from 3,370 pounds of "T-1" Steel, which has a minimum yield strength of 100,000 psi. Maximum working stresses on these parts were designed to 60,000 psi, more than triple the working stress that would be used with carbon steel. This permitted maximum weight reduction while retaining strength.

By using USS MAN-TEN High-Strength Steel in the dozer blade and rear-axle housing, they obtained the necessary strength with a reduction in plate thickness from the usual $\frac{1}{2}$" and 1" down to $\frac{1}{8}$" and $\frac{1}{4}$". USS MAN-TEN steel parts totaling 1,350 pounds were designed to a maximum weight reduction while retaining strength.

The machine shown, a feasibility prototype weighing 8 tons, will be superseded by a $10\frac{1}{2}$-ton production unit powered by a diesel engine instead of an aircraft-type engine. This new item is designed to be conventionally transported by air, and it can be air dropped.

For other military vehicles, United States Steel makes extremely tough, rolled alloy steel armor plate in addition to a complete line of high-strength steels, stainless steels and carbon steels. For more information, write United States Steel, 525 William Penn Place, Pittsburgh 30, Pennsylvania.

USS, MAN-TEN and "T-1" are registered trademarks

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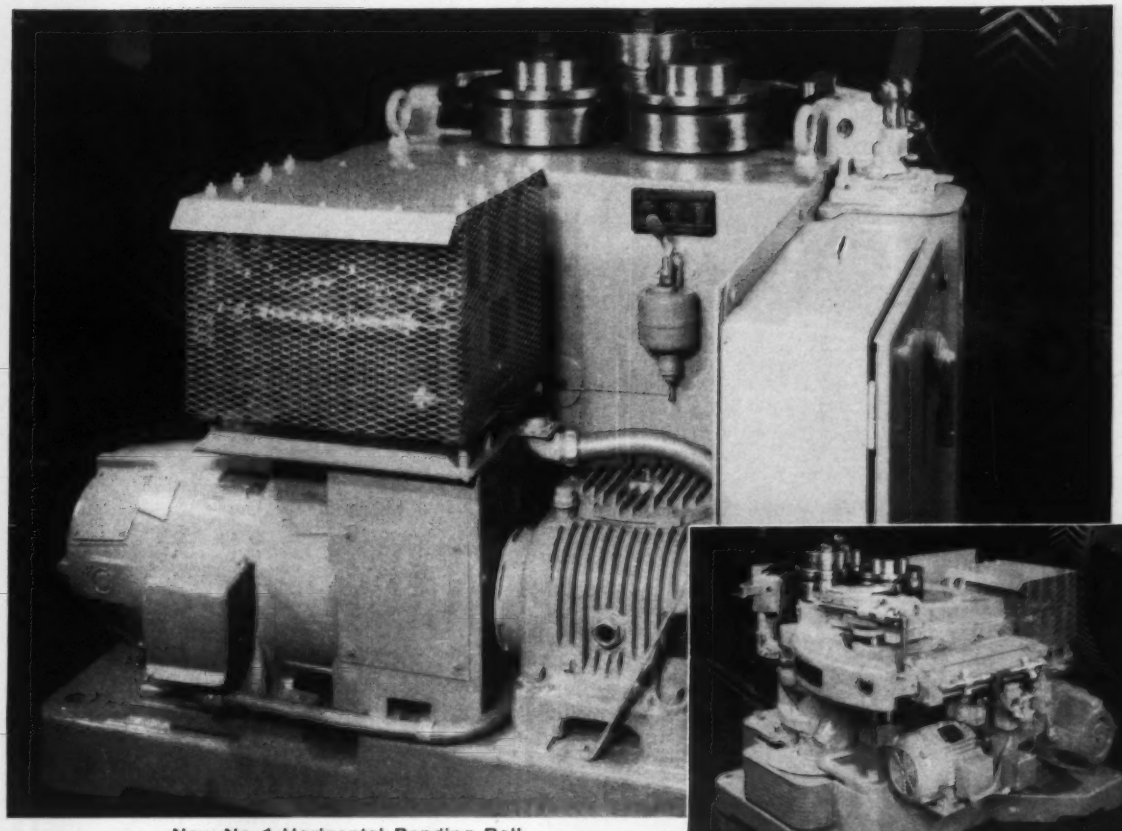
USS



New No. 1 Horizontal Bending Roll

Note Hydraulic Roll Adjustment

SPEED DIE-LESS COLD METAL BENDING WITH IMPROVED 'BUFFALO' BENDING ROLLS

- *Fast* Production Bending of Circles, Arcs and Spirals to Commercial Accuracy.
- *Hydraulic* Roll Adjustment Speeds Setup Time.
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- *Handle* Angles, Rounds, Squares, Tubes, Pipes, Flats and Special Shapes.
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- *Models* and Sizes to Handle All Types of Work.

Improved 'Buffalo' Bending Rolls are engineered for peak accuracy. Rugged construction insures long, trouble-free life. Optional attachments available.

See how 'Buffalo' Bending Rolls can save you production and maintenance time and money. For complete facts, contact your 'Buffalo' machine tool dealer or write the factory direct.

ESTABLISHED 1877 "Buffalo" MEMBER N.M.T.B.A.

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'Buffalo' Air Handling Equipment to move, heat, cool, dehumidify and clean air and other gases.

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'Buffalo' Centrifugal Pumps to handle most liquids and slurries under a variety of conditions.

Squier Machinery to process sugar cane, coffee and rice. Special processing machinery for chemicals.

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YOUNGSTOWN STEEL research is creative digging. It starts with what is known, then strikes out toward tomorrow. In Youngstown's growing research center, well-staffed departments work with slide rules and hot metals. They work with abstract concepts and solid facts. With shapes. With welds and pressures and torsions and tensions. With corrosive conditions and with uncommon coatings. Avenues to better, more useable, more useful steel are opening fast at Youngstown, a growing force in steel.

NEW

YOUNGSTOWN STEEL research is available to you. There is application research to help you use steel more profitably. Metallurgical research to make new steels in answer to new problems. Product research to help you capture a market. All in addition to continuing basic raw material and process research to give you better steel to work with. From tiny test induction furnace heats to miniaturized rolling mills to technical field work, research works for you at modern Youngstown, a growing force in steel.

THE YOUNGSTOWN SHEET AND TUBE COMPANY, YOUNGSTOWN, OHIO.

Youngstown –

ATLANTA BOSTON BUFFALO CHICAGO CINCINNATI CLEVELAND COLUMBUS DALLAS DENVER DES MOINES DETROIT

STEEL R&D

YOUNGSTOWN STEEL research touches atoms and reaches into space. It is a photomicrograph of blue-hued grain. A rending, screeching tensile test. It is a piece of paper covered with a scientist's precise symbology. It is an idea that will improve the already high quality carbon, alloy and Yoloy steels you can buy from Youngstown. Add it up: fine steel sheet, pipe, bar, tin plate, rod and wire products. Reliable service. Plus creative research to back it up. All from Youngstown, a growing force in steel.

YOUNGSTOWN STEEL research is making the stronger, more workable steels of tomorrow. Economical steel, that today does more things better than any other metal, has vast new fields to conquer. From deeper-probing Orange Band drill-pipe to thinner gauge tin plate, to new basic steels, to bold new concepts of tubular construction, steel is destined to play a greater role in your everyday life. Depend on it, just as you can depend on the quality products of Youngstown, a growing force in steel.

growing force in steel

Steel

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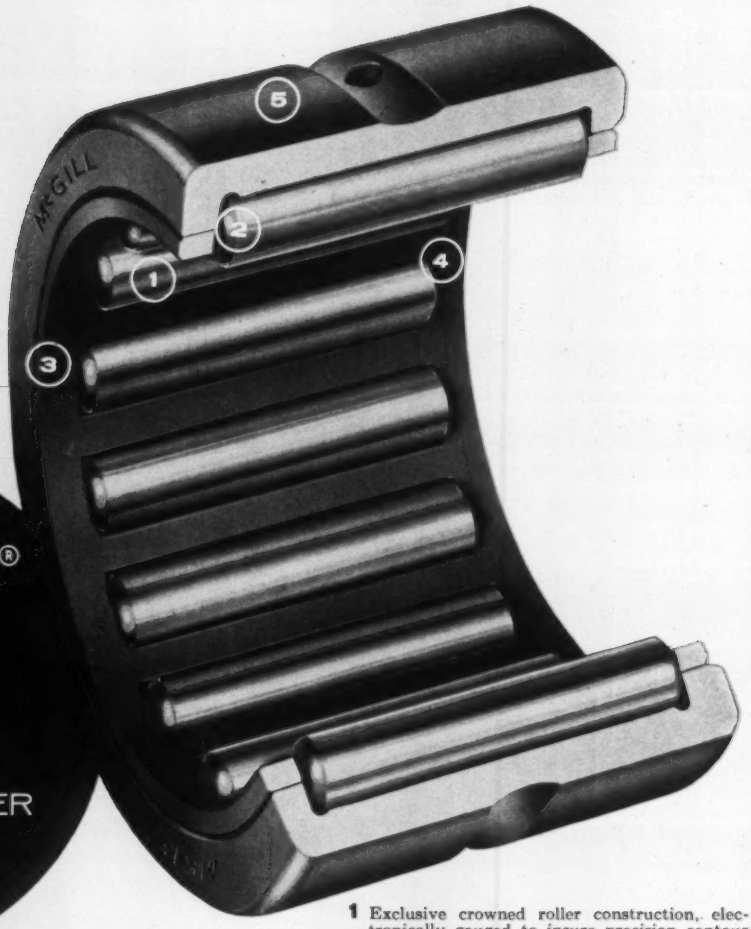
NEW

CAGEROL®

CAGE TYPE
HEAVY DUTY
NEEDLE ROLLER
BEARING



BY McGILL®

INCREASE EXPECTED LIFE UP TO 10 TIMES!

You need CAGEROL bearing performance if higher speeds and increased misalignment have prevented the utilization of needle bearing load capacity in your applications. Most important, CAGEROL bearings can deliver up to 10 times more expected life where misalignment and increased speeds exceed the capabilities of ordinary and guided needle bearings. The difference is in the exclusive McGill construction that features tapered retainer pockets for balanced roller guidance, crowned rollers, and black oxide retainer finish. CAGEROL bearings are interchangeable with all heavy duty needle roller bearings — with or without inners in two bore sizes.

McGILL MANUFACTURING CO., INC., Bearing Division
301 N. Lafayette Street, Valparaiso, Indiana

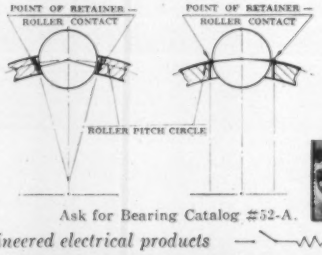
1 Exclusive crowned roller construction, electronically gauged to insure precision contour and size uniformity. Relieved ends assure even load distribution.

2 Flat ends fully engage integral race shoulders, provide maximum support.

3 Proper guidance assured by tapered retainer pockets. The design insures *balanced* roller support and eliminates corner wear from edge loading of straight pockets where retainer OD and pitch circle are coincident.

4 Simultaneously punched pockets assure accuracy of race and roller alignment. The black ferrous oxide retainer finish absorbs and retains lubrication, reducing the friction coefficient.

5 SAE 52100 steel outer race has optimum hardness and surface finish.



Ask for Bearing Catalog #52-A.

engineered electrical products

McGILL®

precision needle roller bearings

When you think of PRECISION

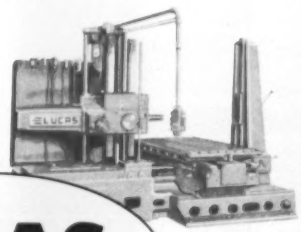
For life time precision Lucas provides

airlift to saddle

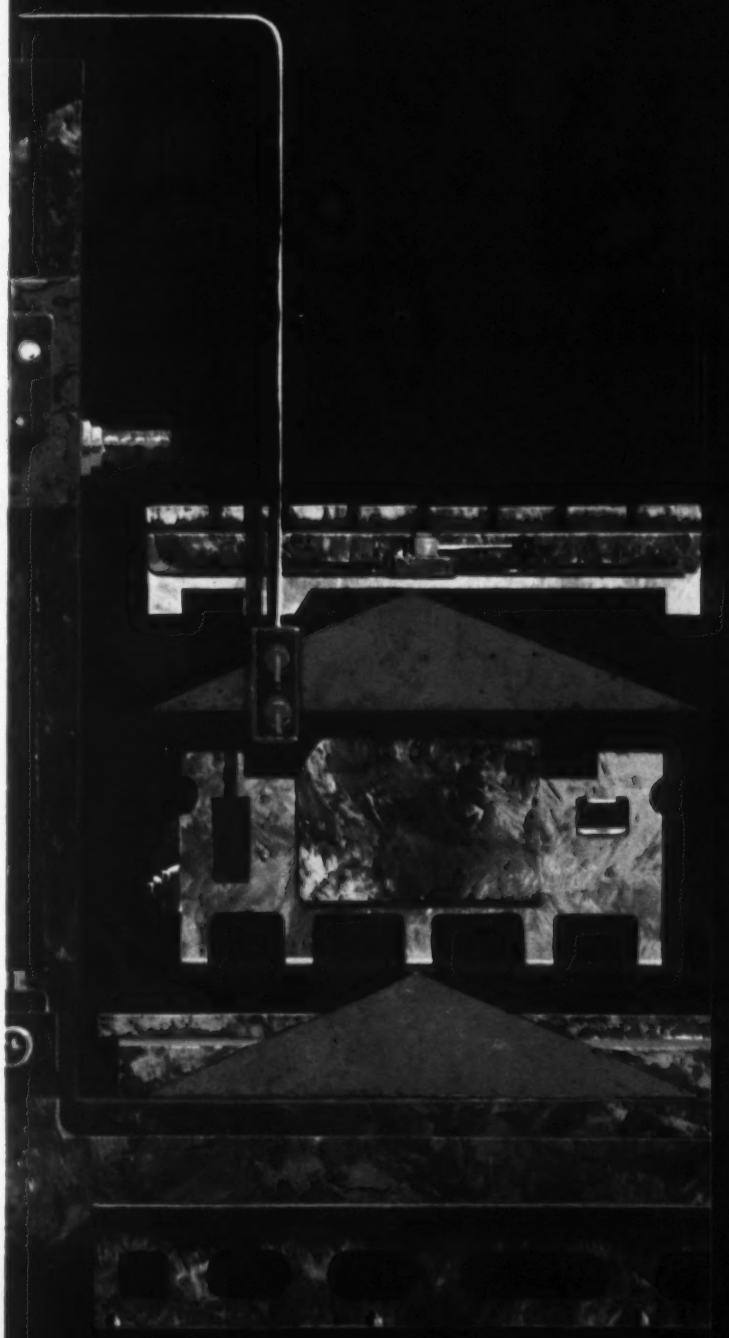
and table.

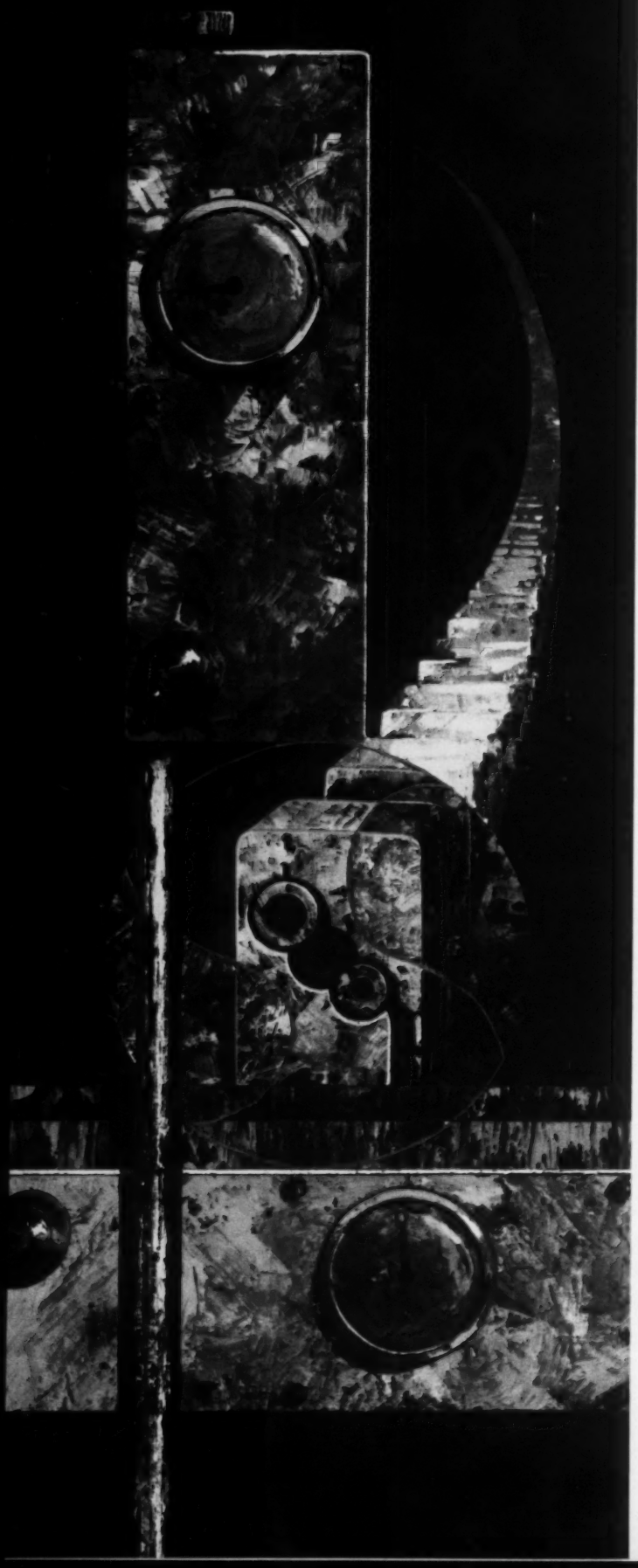
These elements are supported on a thin film of lubricated compressed air during traverse. This separation of metal from metal virtually eliminates wear. During machining cycles the saddle and table are automatically clamped down tight to provide absolute rigidity for even the heaviest cuts. Unclamping is automatic, too. These are two aspects of Lucas design which contribute to the precision of these machines. Lucas Machine Division, The New Britain Machine Company, 12302 Kirby Avenue, Cleveland, Ohio. When you think of Precision . . .

think of . . .



LUCAS
PRECISION





When you think of RELIABILITY

Lucas automatic power positioning

automatically repeats

automatically repeats

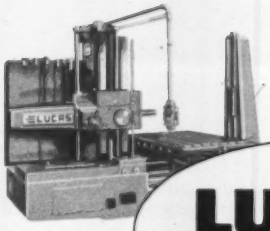
automatically repeats

to ±.0001 . . .

A simple, completely reliable system of dial indicators, end measures, and electrical controls automatically disengages rapid traverse, engages the fixed, constant-rate power feed and precision stops the unit at predetermined settings. Automatic power positioning assures the highest order of repetitive accuracy with an absolute minimum of operator attention.

A new catalog describes our complete line of horizontal boring, drilling and milling machines. Write Lucas Machine Division, The New Britain Machine Company, 12302 Kirby Avenue, Cleveland, Ohio. When you think of Reliability . . .

think of . . .



LUCAS
PRECISION

Figure both to get your final steel cost

Steel is low in cost. You can keep it that way if you don't tack on unnecessary expense. After you've figured initial price don't overlook what it costs to own, store, handle and cut steel for your use. These costs of possession often are hidden. But your steel service center frequently can help you reduce them.

Each steel user's case is different. Ask your steel service center to help you determine the most economical way to buy steel. They will help you figure all your costs of possession, such as:

Cost of capital	Cost of operation	Other costs
Inventory	Space	Obsolescence
Space	Material handling	Insurance
Equipment	Cutting & burning	Taxes
	Scrap & wastage	Accounting

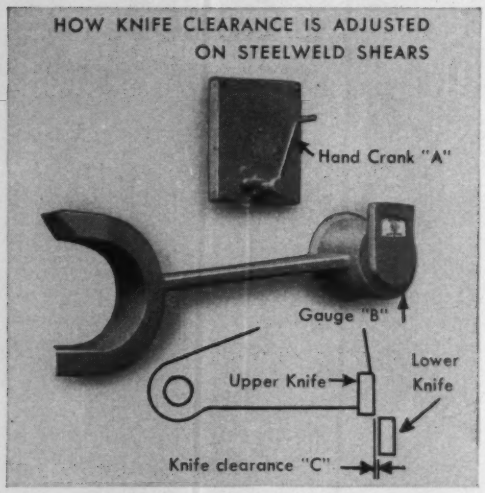
Call your nearby steel service center, or write for free booklet, "What's Your Real Cost of Possession for Steel?"

STEEL SERVICE CENTER INSTITUTE

...YOUR STEEL SERVICE CENTER

STEEL SERVICE CENTER INSTITUTE
540-A Terminal Tower, Cleveland 13, Ohio

SET KNIFE CLEARANCE AT 8% OF METAL THICKNESS



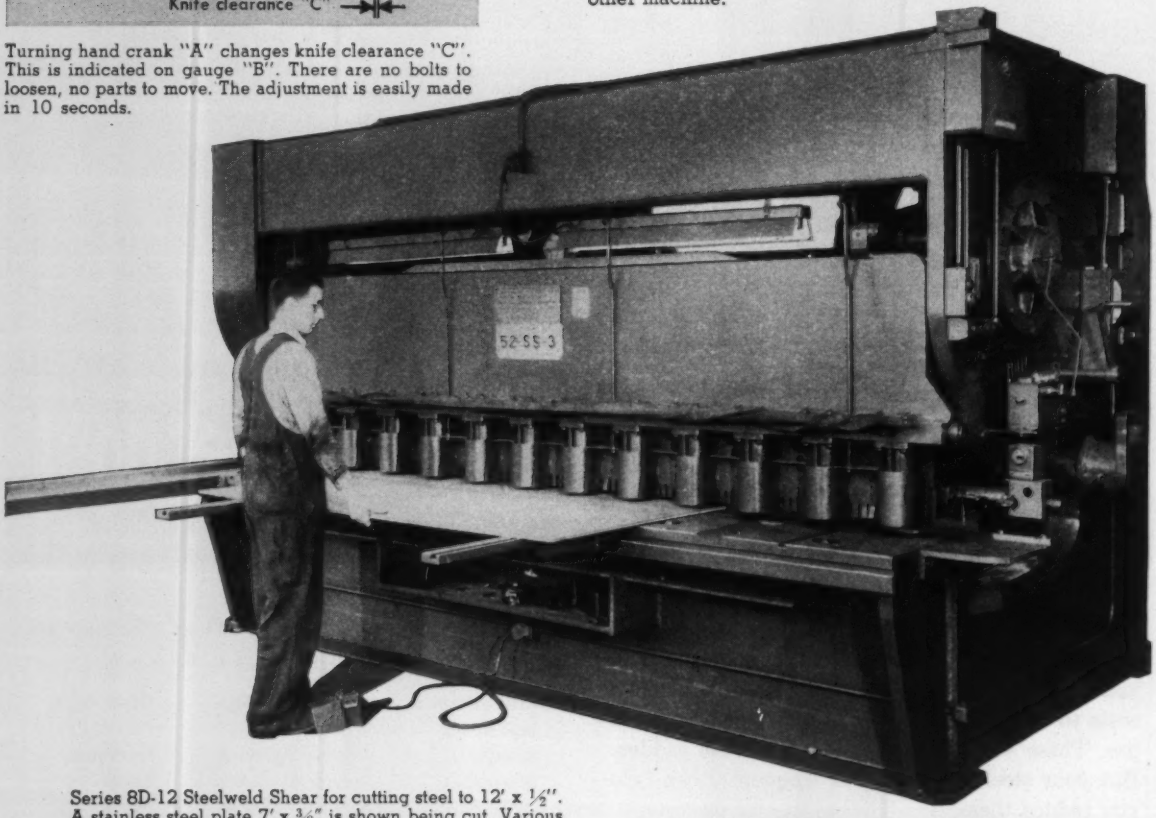
Turning hand crank "A" changes knife clearance "C". This is indicated on gauge "B". There are no bolts to loosen, no parts to move. The adjustment is easily made in 10 seconds.

8% is a good figure to remember when shearing mild steel. By adjusting the clearance between the knives to 8% of the thickness of steel being cut, you will get the best cuts and the knives will stay sharp longer.

Because of the importance of having the right knife clearance for every shearing job, Steelweld Shears were designed to make this adjustment extremely easy. In fact, it can be made in 10 seconds. Consequently, it becomes a natural routine part of a shear operator's job.

You will find this feature invaluable if you shear various thicknesses. It eliminates the need of working with some fixed compromise knife clearance setting with resultant cuts that vary from the ideal more or less as the knife adjustment is off from the correct setting.

Steelweld Shears are the most modern on the market today with more features that make for speed, accuracy and long trouble-free operation. Some of their fine features are not obtainable in any other machine.



Series 8D-12 Steelweld Shear for cutting steel to 12' x ½". A stainless steel plate 7' x ⅜" is shown being cut. Various thickness plates, as well as heavy steel grating, are also cut on this machine, which is in a West Coast plant. Knives on this hard-working shear last 3 to 6 months before they need to be turned to another cutting edge.

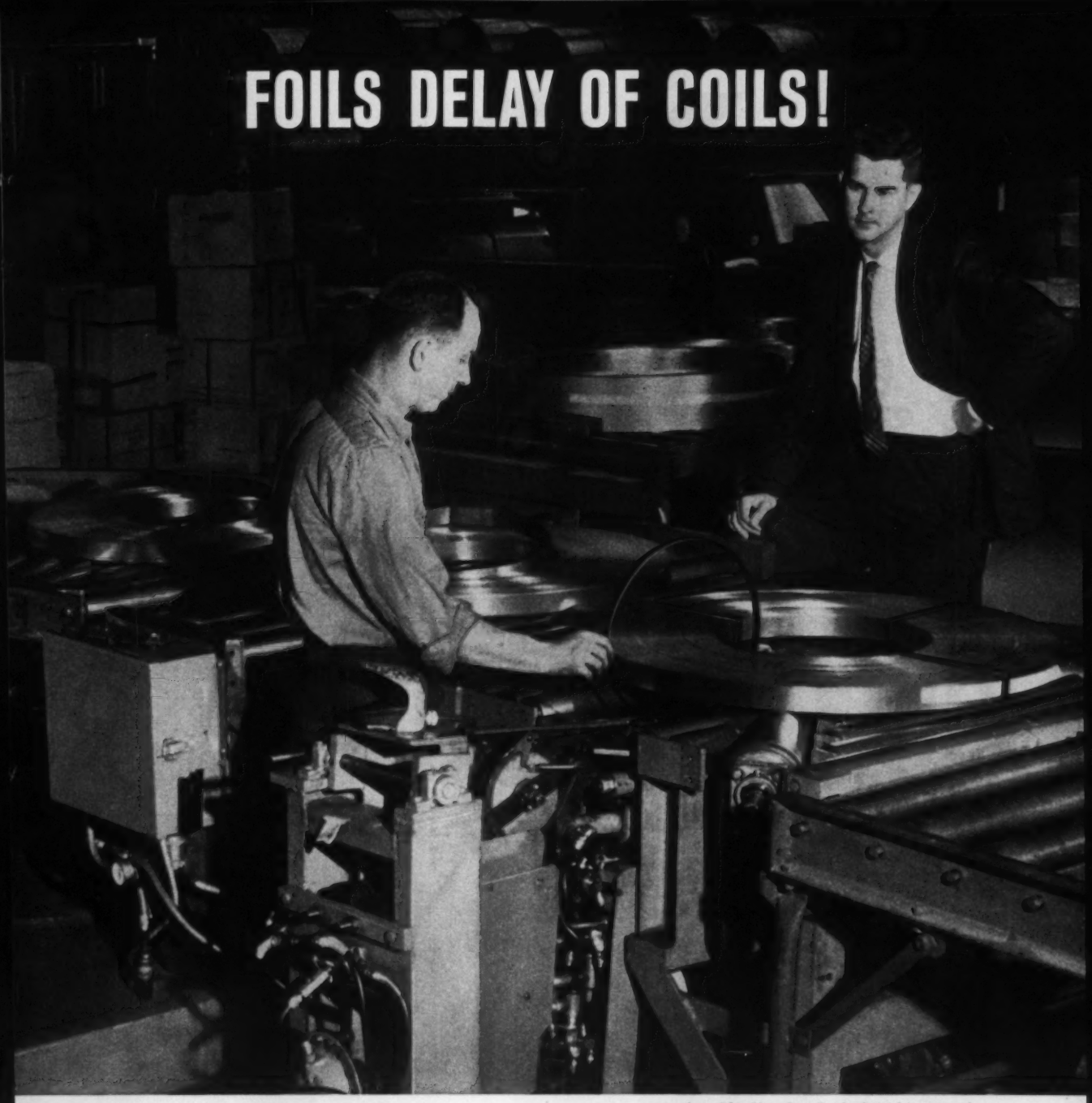
Write for free copy of Catalog No. 2011
Gives construction and engineering details

STEELWELD

PIVOTED BLADE **SHEARS**

STEELWELD MACHINERY DIVISION • THE CLEVELAND CRANE & ENGINEERING CO. • 7854 E. 282 ST. • WICKLIFFE, OHIO

FOILS DELAY OF COILS!



Acme Idea Man Gene Fairbank (right) suggested Idea No. S4-12 to United Flat Rolled Products, Chicago.

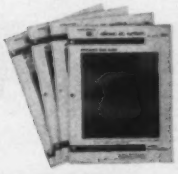
United Flat Rolled Products, Chicago, beat bottlenecks in slit coil production with a conveyorized Acme Steel F4 Strapping Machine—and tripled production capacity in the process!

Slow hand strapping methods tied up slitting equipment as much as 45 minutes per hour. Now, slit coils flow smoothly from slitter to strapping machine on roller conveyors. One operator, handling both coil tying and unitizing operations, keeps well ahead of two slitters.

Solving sluggish production problems is an every-day challenge to your Acme Idea Man. For full details, call him or clip the coupon.

ACME STEEL IDEA LEADER IN **STRAPPING**

ACME STEEL COMPANY
AcmeSteelProductsDivision
Dept. SBS-110
135th St. & Perry Ave.
Chicago 27, Ill.



Please send me Idea No. S4-12 and examples of how major companies in my field use Acme Steel Strapping.

*Name*_____

*Title*_____

*Firm*_____

*Address*_____

*City*_____ *Zone*____ *State*_____

BUILD IN STRENGTH AND LIGHT WEIGHT WITH N-A-X FINEGRAIN STEEL

In a wide variety of applications N-A-X FINEGRAIN—a low-alloy high-strength steel—can bring important weight savings without sacrifice of strength and safety. When you design N-A-X FINEGRAIN into your product, you get *all* these advantages:

- It is 50% stronger than mild carbon steel.
- Polishes to a high luster at minimum cost.
- Can be cold formed readily into difficult stampings without surface disturbances.
- Is stable against aging.
- Has high fatigue life with great toughness.
- Has greater resistance to wear and abrasion.
- Is readily welded by any process.
- Offers greater paint adhesion.
- Has twice the resistance of carbon structural steel to normal atmospheric corrosion.*

*Where greater resistance to extreme atmospheric corrosion is important, our N-A-X HIGH-TENSILE is recommended.

Sound like something for you? A thoroughly competent metallurgical service organization is available to work with you on any application problem you may have. Write, wire or phone Product Development Department, Great Lakes Steel Corporation, Detroit 29, Michigan.

N·A·X FINEGRAIN STEEL

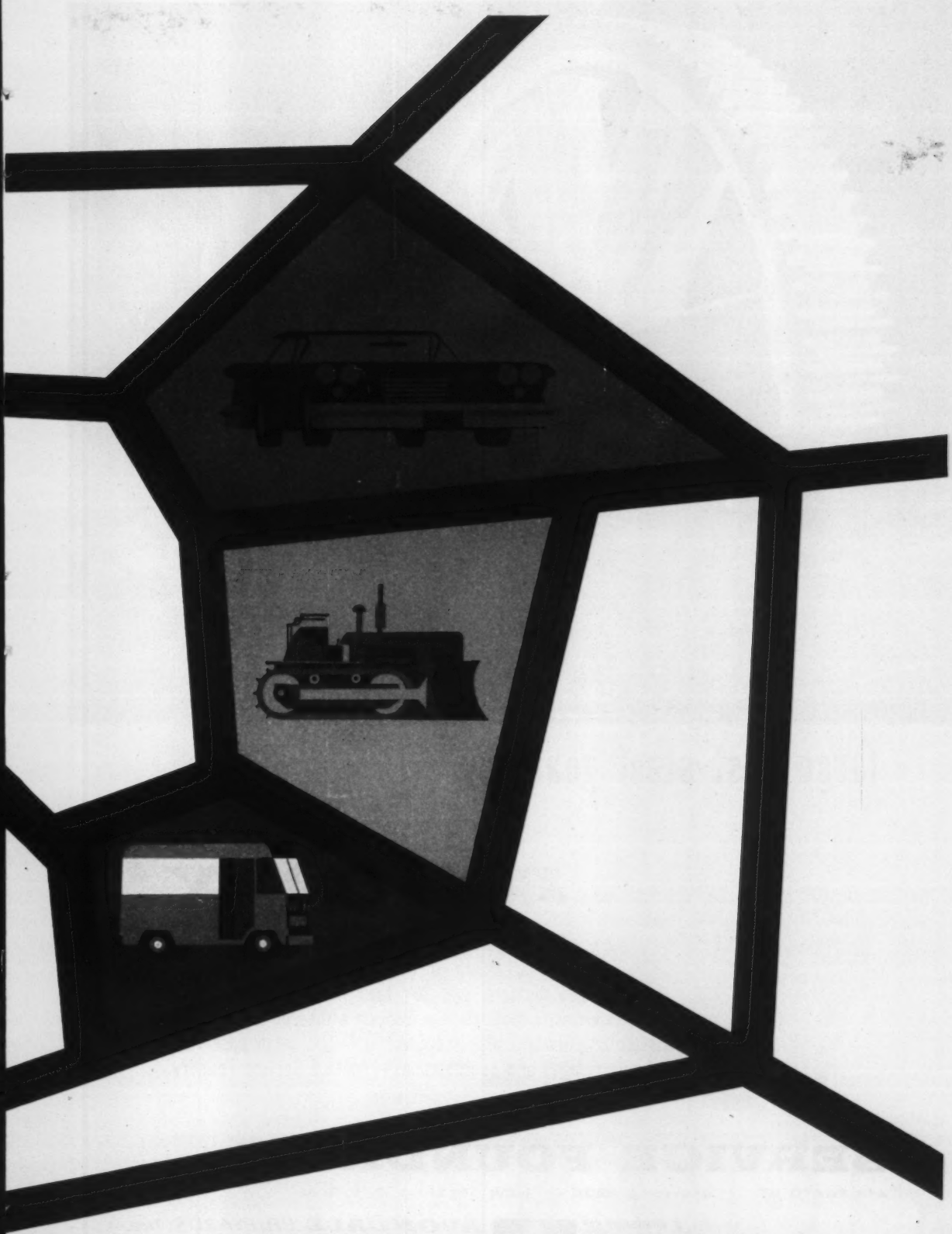
A PRODUCT OF

GREAT LAKES STEEL

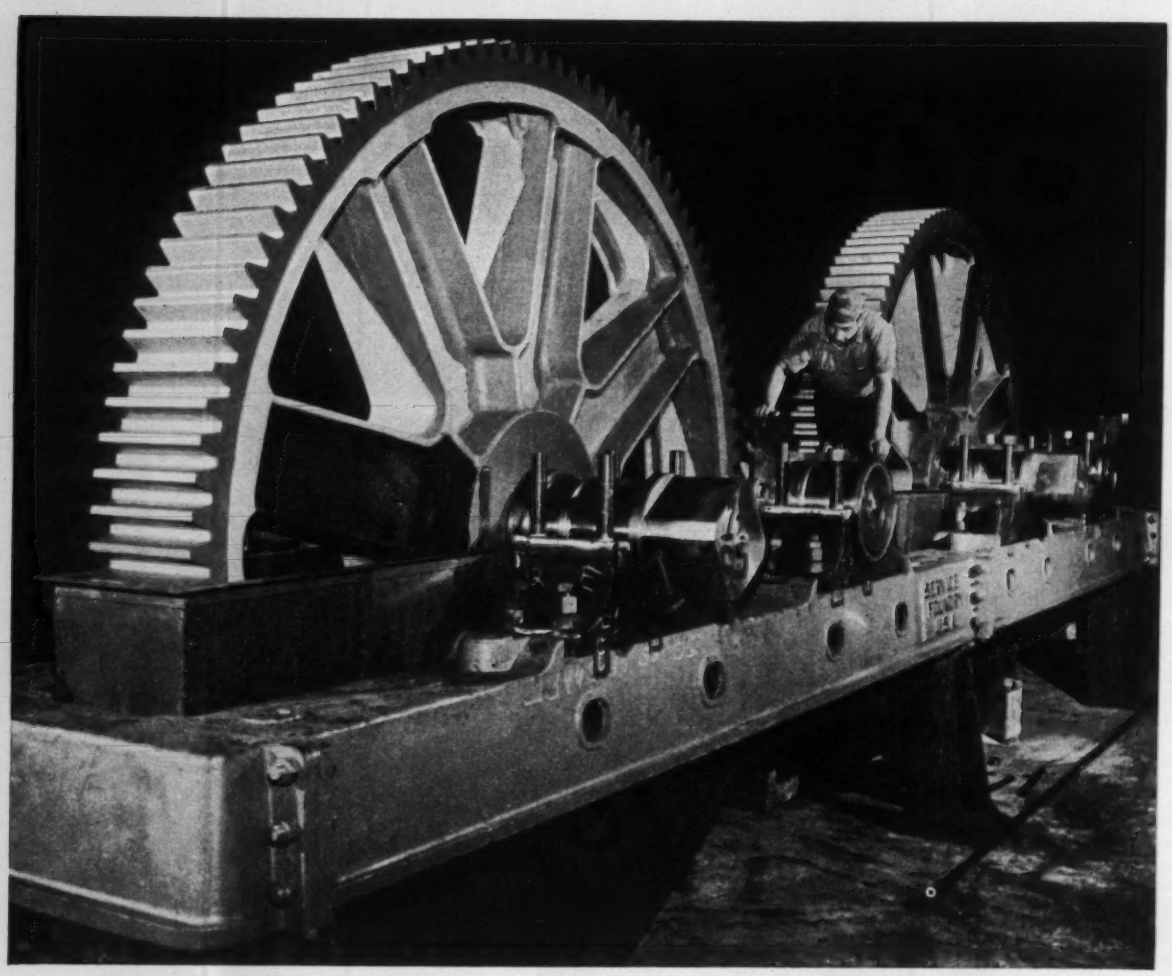
Detroit 29, Michigan

Steel

Look for the STEELMARK on the products you buy; place it on the products you sell.



Great Lakes Steel is a Division of **NATIONAL STEEL CORPORATION**



large cast steel gears by

SERVICE FOUNDRY

Service Foundry Division of Avondale manufactures cast steel gears (plain or alloyed) up to 16′-1½″ outside diameter and 30″ face. Teeth are cut without limitation as to tooth form or size on a Gleason gear planer. Cast tooth gears are also manufactured. For large cast steel gears to your designs and specifications—contact Service Foundry.

SERVICE FOUNDRY

416 ERATO ST. • JAckson 2-3836 • NEW ORLEANS 13, U. S. A.

A DIVISION OF **AVONDALE SHIPYARDS, INC.**

FORMERLY AVONDALE MARINE WAYS, INC.

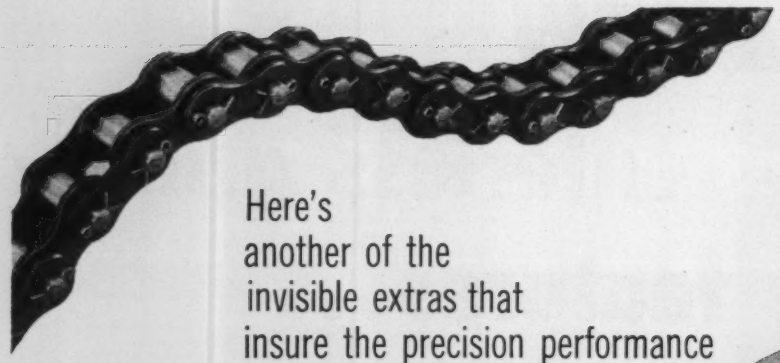
only the allNEW LANDIS centerless grinder has these features...

allNEW Truform dressers—with preloaded ball slides for exact dressing and profiling of grinding and regulating wheels... **allNEW** rotary diamond tool and crush dressing—available for profiling grinding wheels... **allNEW** Landis Lockspeed regulating wheel drive—for rounder workpieces and faster grinding cycles

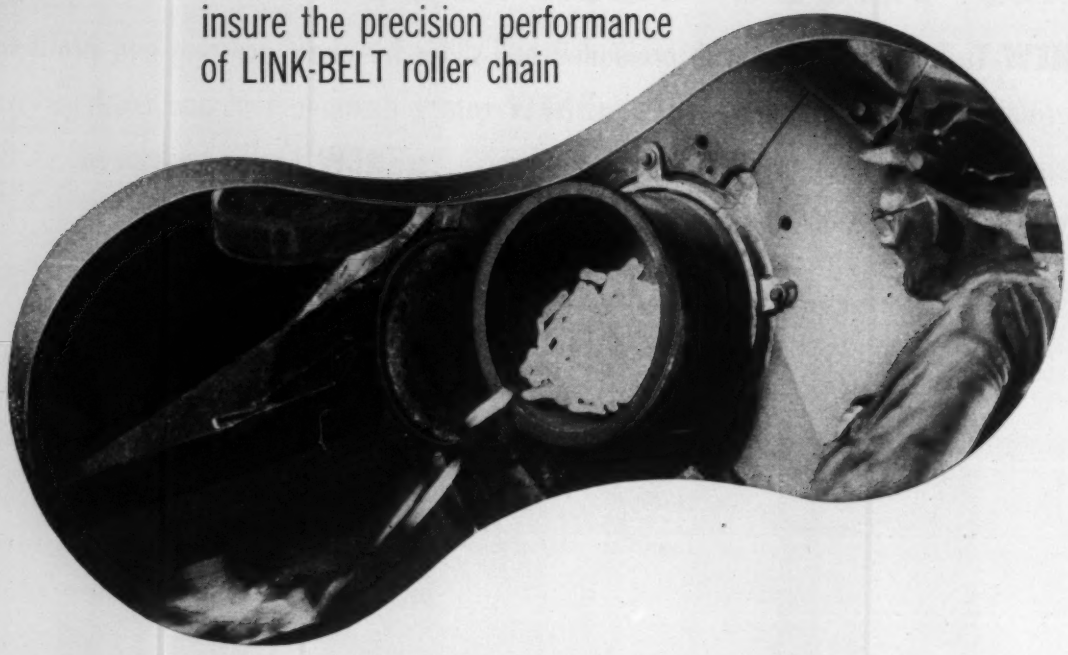
LANDIS

world leader in precision grinders

LANDIS TOOL COMPANY / WAYNESBORO, PENNSYLVANIA



Here's another of the invisible extras that insure the precision performance of LINK-BELT roller chain

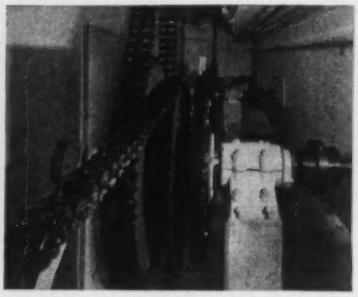


Painstaking precision of heat-treat control gives you

uniform strength in every link

To produce roller chain of utmost uniformity, Link-Belt maintains exacting control of all heat-treating processes. With equipment and instrumentation exactly tailored to the need, all processes are carefully adjusted to suit the characteristics of each heat and analysis of steel. Result: roller chain of uniform strength *well above accepted standards*. Chain that absorbs shock loads, delivers full power under continuous heavy going.

Precise heat-treat control is one of many *invisible extras* that contribute to the greater strength and endurance of Link-Belt roller chain. Others include prestressing, pitch-hole preparation, shot-peening. These features—plus painstaking precision and inspection in every step of manufacture—assure you of chain that can easily cope with today's heavy loads and high speeds.



Single and double strand Link-Belt roller chains combine to provide dependable, positive power transmission at this installation.

For engineering assistance in applying industry's preferred roller chain, contact your nearest Link-Belt office or authorized stock-carrying distributor. Ask for Book 2657.

LINK-BELT COMPANY: Executive Offices, Prudential Plaza, Chicago 1. To Serve Industry There Are Link-Belt Plants, Warehouses, District Sales Offices and Stock Carrying Distributors in All Principal Cities. Export Office, New York 7; Australia, Marrickville (Sydney); Brazil, Sao Paulo; Canada, Scarboro (Toronto 13); South Africa, Springs. Representatives Throughout the World. 15,554

LINK-BELT

ROLLER CHAINS AND SPROCKETS

Now reduce aisles to 6′–capture ←36%→ "lost" storage space–as Glidden did!

By purchasing the Towmotor "Naro-Aisle-Stack" Series fork lift truck pictured above, The Glidden Company realized an immediate 36.8% gain in storage capacity at their Reading, Pa. warehouse.

Reducing 9′ 6″ wide aisles to six feet enabled the new lift truck—which stacks heavy loads 90° left or right in the narrow aisles—to bring Glidden many other advantages as well. Now 42% more Glidden products are warehoused. Order filling and shipping are expedited. And the cost of additional warehouse facilities was averted.

Find out how this new "Naro-Aisle-Stack" Series truck can save *your* space, time and dollars as it has for The Glidden Company. Write for new booklet, "Captures Lost Space." TOWMOTOR CORPORATION, CLEVELAND 10, OHIO.

NEW "NARO-AISLE-STACK" SERIES FORK LIFT TRUCKS DESIGNED AND BUILT BY...

TOWMOTOR® THE ONE-MAN-GANG -GERLINGER

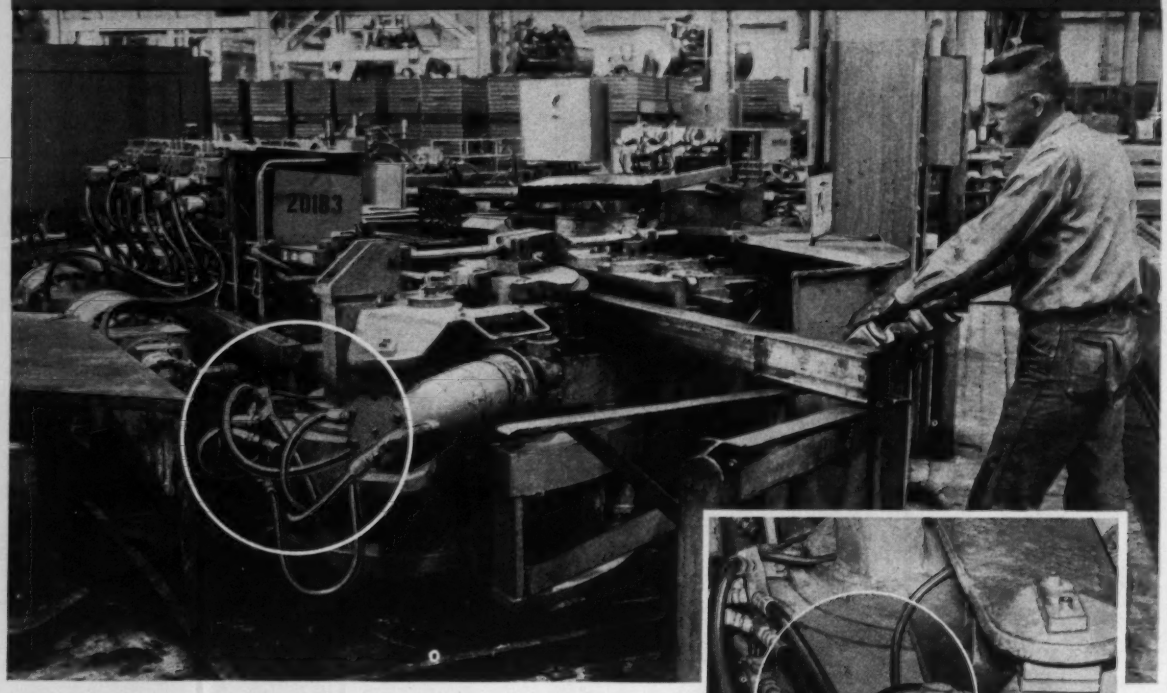
FORK LIFT TRUCKS, CARRIERS AND TRACTORS SINCE 1919

Gerlinger Carrier Co. is a subsidiary of Towmotor Corporation

AEROQUIP 1508 HIGH PRESSURE SPIRAL WIRE WRAP HOSE

Reduces Maintenance Costs On Hydraulic Bender

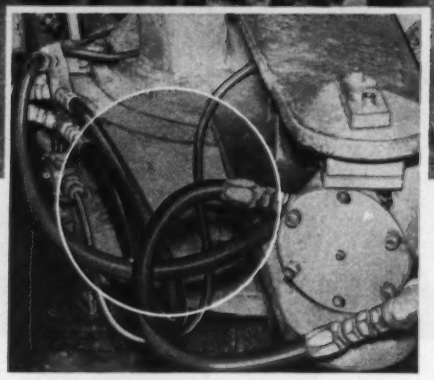
From the job report of a leading plant producing auto frames and stampings



Aeroquip 1508 High Pressure Spiral Wire Wrap Hose and Reusable Fittings provide greater strength and hose flexibility for a leading producer of auto frames. Installed on clamps of hydraulic benders, Aeroquip Hose undergoes constant flexing and pressure surges of 2200-2500 psi. Results? Aeroquip flexibility and strength have prevented hose failures from causing unnecessary maintenance and costly downtime.

Aeroquip Hose and Reusable Fittings help save time, when infrequent hose replacement is required. Hose is cut to length, and the replacement is made right on the job—no special tools are needed. Fittings can be reused again and again.

Your Aeroquip Distributor is a fluid line specialist. He will give you a copy of our Industrial Catalog No. 204 and show why you are in good hands when you consult with Aeroquip. His telephone number is in the "Yellow Pages" under "Hose."



Aeroquip 1508 Hose reduced maintenance on the clamps of these benders for auto frame rails.

Aeroquip is so easy to use—
Your inventory is just a few feet of hose and a handful of fittings.

STANDARDIZE ON Aeroquip

REG. TRADEMARK

AEROQUIP CORPORATION, JACKSON, MICHIGAN

INDUSTRIAL DIVISION, VAN WERT, OHIO • WESTERN DIVISION, BURBANK, CALIFORNIA
AEROQUIP (CANADA) LTD., TORONTO 19, ONTARIO

AEROQUIP PRODUCTS ARE FULLY PROTECTED BY PATENTS IN U. S. A. AND ABROAD

PAGE SPECIAL HB
Can Cut Wire Costs Up to 60%

You can use PAGE *Special* HB for many jobs where music wire has always been specified—and save up to 60% on your wire costs! Tensile strengths of *Special* HB, which is available in the size range .020" diameter to .162" diameter (bright finish and galvanized), approach those of music wire in all sizes—and in sizes .090" diameter and coarser equals them! Here are some typical examples:

SIZE	STANDARD HB	*SPECIAL* HB	MUSIC WIRE
.1620	219,000 min.	**249,000 min.**	249,000 min.
.1350	227,000 "	**258,000 "**	258,000 "
.0800	244,000 "	**276,000 "**	282,000 "
.0200	310,000 "	**320,000 "**	350,000 "

If you now use music wire, or have been prevented from using it because of its high cost, it makes sense to investigate PAGE *Special* HB.

WHATEVER your wire requirements, you can count on PAGE quality from America's leading special-purpose wire mill. PAGE will give you the tensile strength, ductility, finish, tolerance and other properties you require in a wide range of manufacturers wire items — including corrosion-resistant ACCO *Aluminized* Wire and wires of special shapes.

Write for details. Write us at Monessen, Pa., for Booklet **DH-107a** for the story on PAGE *Special* HB—or for information on other wires.

ACCO

PAGE MANUFACTURERS WIRE

Page Steel and Wire Division • American Chain & Cable Company, Inc.

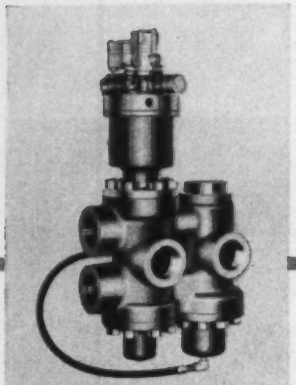
Monessen, Pa., Atlanta, Chicago, Denver, Detroit, Houston, Los Angeles, New York, Philadelphia, Portland, Ore., San Francisco, Bridgeport, Conn.

PAGE — *the source for answers to wire problems*

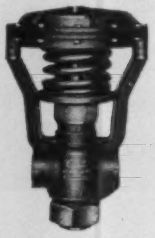
Solve your fluid control problems with

SINCLAIR-COLLINS

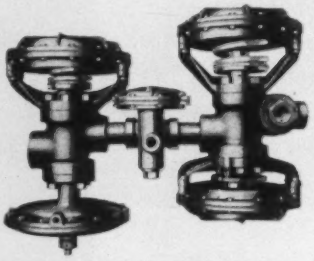
Diaphragm-Operated Valves



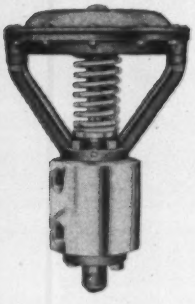
3,000 PSI, 4-WAY SEMI-AUTOMATIC air operated, handles oil, water, glycol-base fluids, 1 - 2 in. NPT.



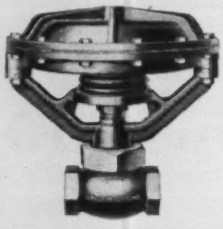
300 PSI, 3-WAY OR REVERSE ACTING bridge yoke, triple-guided stem, ¼ - 3 in. NPT.



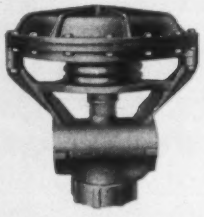
4,000 PSI, 3-WAY AUTOMATIC 2-pressure, auto-neutral, throttling, ½ - 3 in. NPT.



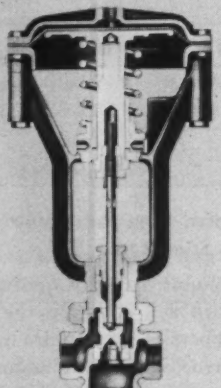
4,000 AND 6,000 PSI, 2 AND 3-WAY BALANCED NC or NO, pressure above or below seats, ½ - 2 in. NPT.



150 AND 300 PSI, DIRECT ACTING globe body, top-guided stem, ¼ - 3 in. NPT.



150 PSI, 3-WAY OR REVERSE ACTING, ¼ - 3 in. NPT VACUUM, 2-WAY, 1 - 3 in. NPT compact design, positive sealing, bridge yoke.



250 PSI, 2-WAY V-PORT MODULATING controls temperature, pressure or flow, direct or reverse acting, ½ - 2 in. NPT.

FOR HOT OR COLD RAW WATER, OIL, AIR, STEAM SERVICE
2, 3, AND 4-WAY • SINGLE OR TWO PRESSURE
HIGH OR LOW PRESSURE • AIR OPERATED
AUTOMATED OR REMOTE MANUAL CONTROL
IDEAL FOR CENTRAL RAW WATER HYDRAULIC SYSTEMS

Chances are, you'll find the answer to your control valve problems in Sinclair-Collins' line. Sound design and highest quality construction . . . Stellite stem seats, Monel stems, hardened replaceable body seats, heavy-duty bronze, ductile iron or cast steel bodies . . . these and many other features assure leak-free performance . . . resistance to corrosion . . . elimination of seat wire drawing . . . longest service life.

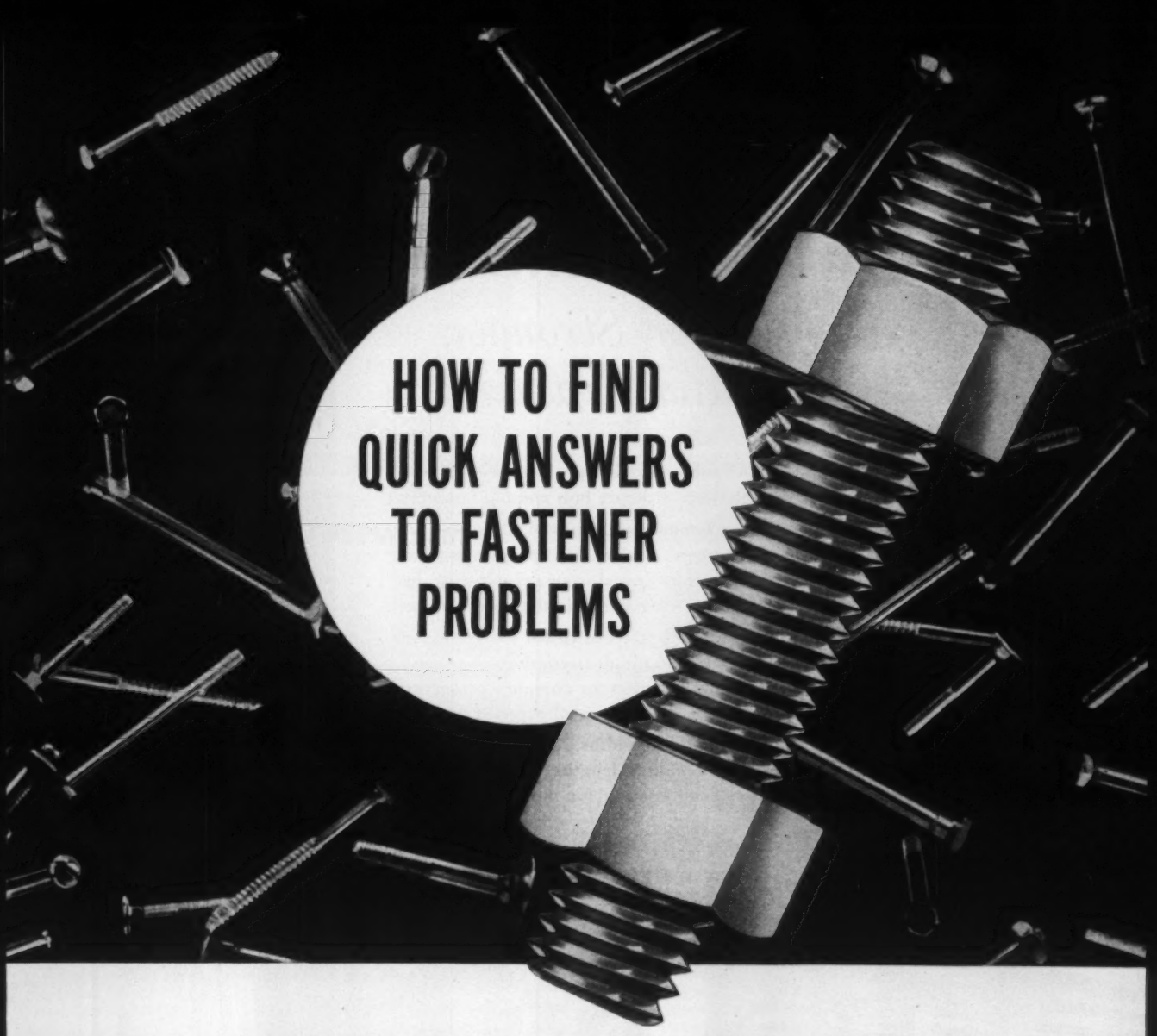
For application engineering recommendations, contact your nearby Sinclair-Collins field engineer.

For more information, write for Bulletin SC-59. Address The Sinclair-Collins Valve Company, Akron 11, Ohio, Dept. ST-1160.

The SINCLAIR-COLLINS VALVE Co.

DIVISION OF INTERNATIONAL BASIC ECONOMY CORPORATION (IBEC)
AKRON 11, OHIO

B129



HOW TO FIND QUICK ANSWERS TO FASTENER PROBLEMS

Your Republic Bolt and Nut Distributor Can Help You

Finding quick solutions to fastening problems is one of your Republic Bolt and Nut Distributor's special talents. He and his staff are as close as your phone—ready to go to work on *your* problem at a moment's notice. If personal, face-to-face consultation is needed, he's located nearby, and will be glad to meet with you at your convenience.

His knowledge of the fastener industry comes from first-hand experience in meeting fastening requirements for dozens of different types of businesses and industries. He's well acquainted with all the newest methods and techniques. In addition, he's backed by the know-how of Republic Steel—a company whose fastener background spans a century.

Helping you discover problem-solving fastener ideas is just one of many ways your Republic Bolt and Nut Distributor can serve you. In fact, *service is his business*—modern top-quality *fasteners, his product.* Why not depend on him for both.

Call your local distributor for quick deliveries of...

REPUBLIC Bolts and Nuts

REPUBLIC STEEL

METAL LUMBER

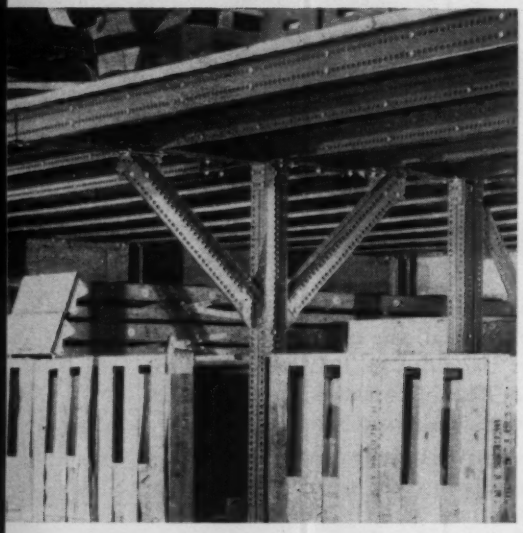
. . . Faster, Stronger, Safer Framing

Republic METAL LUMBER® solves framing problems fast. Simply measure, cut, assemble with ordinary bolt and nut fasteners.

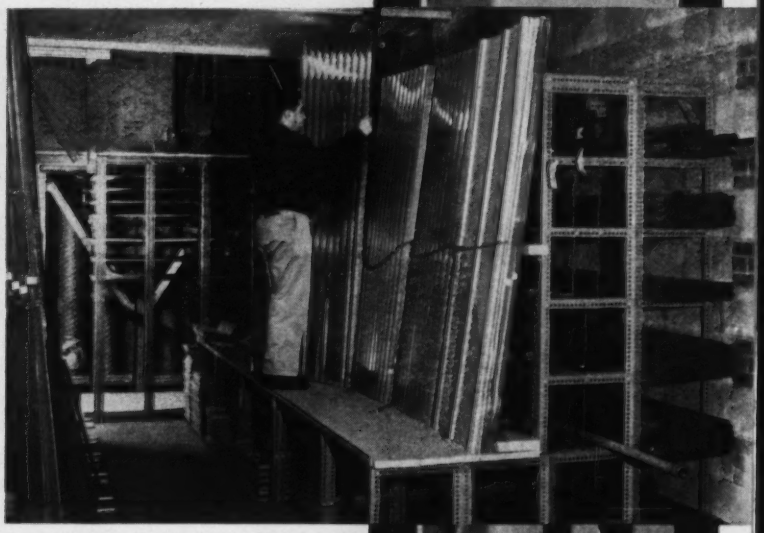
Bolting pattern is a symmetrical series of transverse and longitudinal slots, punched on ¾" centers. This pattern provides bearing capacity in joints equal to or greater than that of the angles in the beam section.

METAL LUMBER is fabricated from cold rolled steel to assure uniform physical properties, and high strength-to-gage ratio. And Bonderized after fabrication for complete protection to all exposed surfaces.

Available in two gages, two widths, in standard bundles of either 10- or 12-foot lengths. Order from your Republic-Berger warehouse. Send coupon for more information.

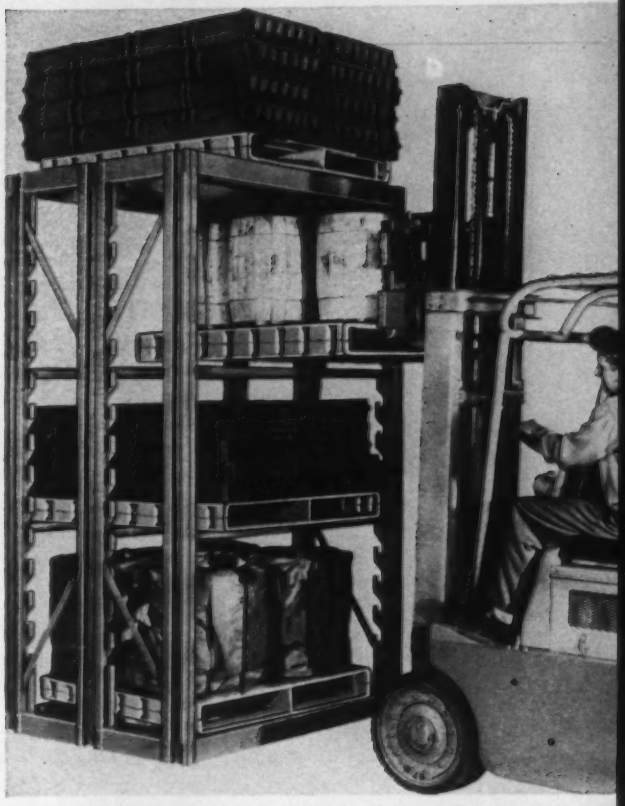


Build any framing structure faster and easier. No skilled labor required. METAL LUMBER won't warp, can't crack, splinter, or rot; is reusable. Mezzanine structure permits maximum storage at Millhurst Mills, Freehold, New Jersey.



METAL LUMBER solves many warehouse storage problems. Here, split-level storage has METAL LUMBER bins engineered for every type of building product. Flooring is laid on top of metal framing on lower level. METAL LUMBER is used throughout the Millhurst Mills Warehouse.

STANDARD REPUBLIC MATERIALS HANDLING UNITS SIMPLIFY CONTAINERIZATION. Save time in stack, store, ship operations, and reduce storage space requirements. Standard Republic Boxes feature heavy-duty stacking brackets and corrugated construction that combine to deliver long, efficient service at low per-year cost. Four-way fork channels simplify handling in restricted space. Republic-Berger materials handling specialists will work with you in solving your problems. Write today.



REPUBLIC STEEL PALLET RACKS, another Republic standard materials handling unit, save space and simplify palletizing and stacking of bulky, uneven, odd-lot, and fragile materials. Tubular steel supports adjust every six inches to handle palletized material of any height. Two-way entry permits loading and unloading from either side. Select single pallets from any level without restacking. Write for specifications and data.

REPUBLIC WEDGE-LOCK® PARTS STORAGE UNITS are easy to load and unload from either side. A rigid, strong long-parts storage unit, because, the heavier the load, the tighter the grip. Wedge-Lock construction features a post that will not bend, a reinforced shelf that does not sag, and a concealed sway-proof joint. Unlimited shelf arrangements. Send coupon for complete details.

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Please send additional information on the following:

- ☐ Republic METAL LUMBER
- ☐ Materials Handling Equipment
- ☐ Republic Wedge-Lock Shelving
- ☐ Republic Pallet Racks

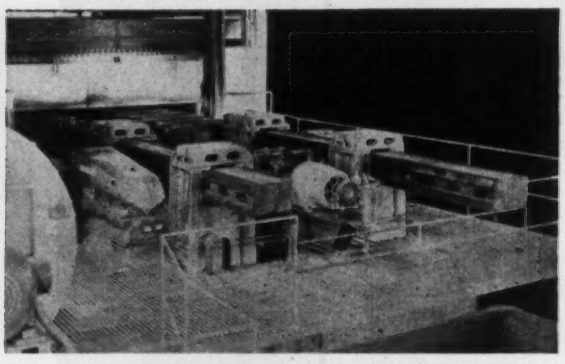
Name_____ Title_____

Firm_____

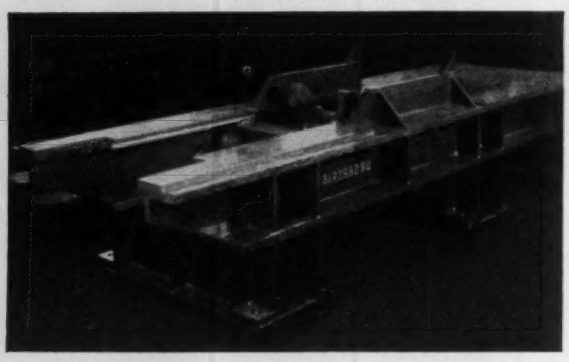
Address_____

City_____ Zone____ State_____

Ram type furnace pusher at shop assembly, made for double or single row pushing of end charged furnace.

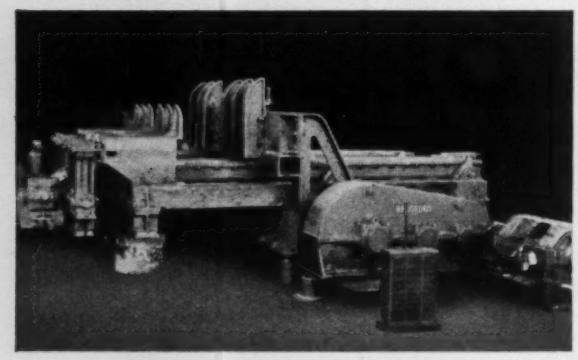


Ram type pushers with clutch for pushing single or double rows of 12" x 12" blooms in end charging furnace.

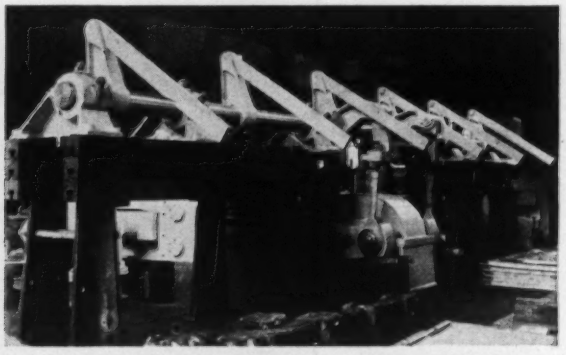


Single hydraulic type pusher. Billets are charged on raised skids by crane and turned down in front of dogs.

Double dog type furnace pusher. Blooms are placed directly on feeder bed by crane. First set of dogs advances blooms to pushing position. Second set of dogs pushes blooms through furnace.



Slab furnace pusher with depiling magazine. Crane places pile directly in magazine and pusher strips slabs off the bottom and pushes into furnace.



Bar type pusher for pushing side charged furnace.

Furnace Pushers by

MM 86-60

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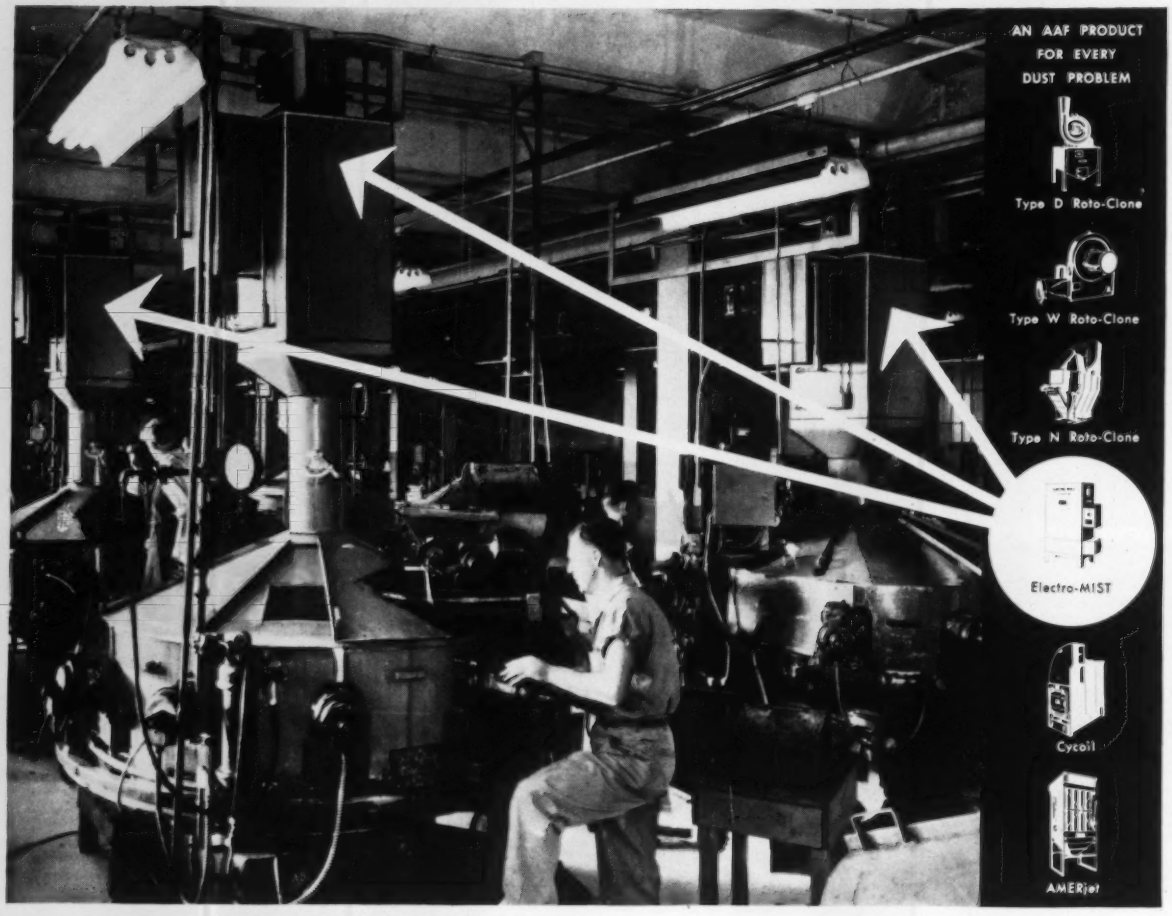

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HOME MAILBOXES

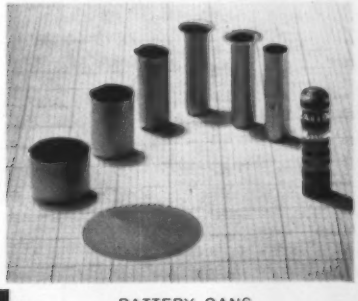
LUGGAGE LOCKS

LIPSTICK BASES

CABINET HARDWARE

HOW TO CUT COSTS, BOOST PRODUCT APPEAL WITH THOMAS STRIP PRE-COATED STEEL

please turn page



BATTERY CANS

BOILER TOPS

Pittsburgh Steel Company

Pittsburgh Steel Company

Luggage Locks—Brass Coated strip "strongly helped us compete against low-cost, brass plated imports." That's acclaim John A. Long, vice president-general manager, Long Manufacturing Co. Inc., gives Thomas Strip's brass coated steel. Long, of Petersburg, Va., is the nation's second largest luggage hardware maker. It was hard hit by foreign-made brass locks. "It was a crucial time in one of our big markets," says Sales Manager Edward C. Coleman. "We started looking for new methods and materials. Now, with new designs and using Thomas brass coated strip, we're able to fight foreign competitors." Eliminating plating and hand polishing with brass coated strip, buffed and lacquered on one side, Long trimmed 11 production steps. Result: 50% cost saving on compact-type luggage lock. Thomas Strip maintains product quality, helps Long increase die life; clear lacquer coat acts as lubricant in forming, prevents galling, and preserves product finish in inventory and in handling.

THOMAS STRIP: TRIMS METAL COSTS, SAVES PRODUCTION STEPS, UPGRADES PRODUCTS

Metal fabricators get a head start toward material and production savings with Thomas Strip's coated steel specialties.

Combining the beauty and utility of costlier metals with the strength, economy and formability of steel, Thomas Strip also offers greater product versatility, durability, buyer appeal and design potential.

Here are benefits available to you in Thomas Strip:

• **Shortens Manufacturing Cycle**—Precoated Thomas Strip is ready to fabricate when it's delivered. Initial preparation, cleaning, buffing, final finishing are already done in many cases—you're steps ahead in production.

• **Provides Economy of Steel**—By replacing more expensive metals, but retaining their finish or functional properties, precoated Thomas Strip reduces material costs.

• **Fabricates Easily**—Electrolytically applied, hot-dipped, painted or bonded, Thomas Strip coatings endure fabrication as readily as easy-to-work base steel.

• **Cuts Plating Costs**—Serving as final finish or as base for further plating or painting, Thomas Strip eliminates or at least reduces fabricators' piece-plating expense.

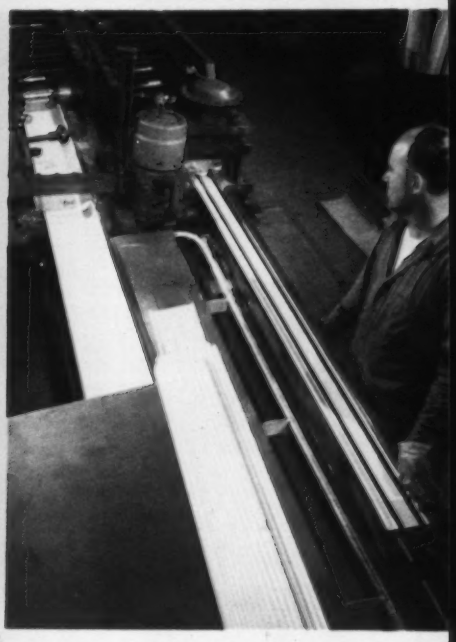
• **More Pieces Per Pound**—Precision rolling and plating to extremely close tolerances give maximum yield in parts per pound.

A study of the experiences of Thomas Strip users pictured on these pages should convince you of the benefits available to your product application—or to that product idea in the back of your mind. Read them.

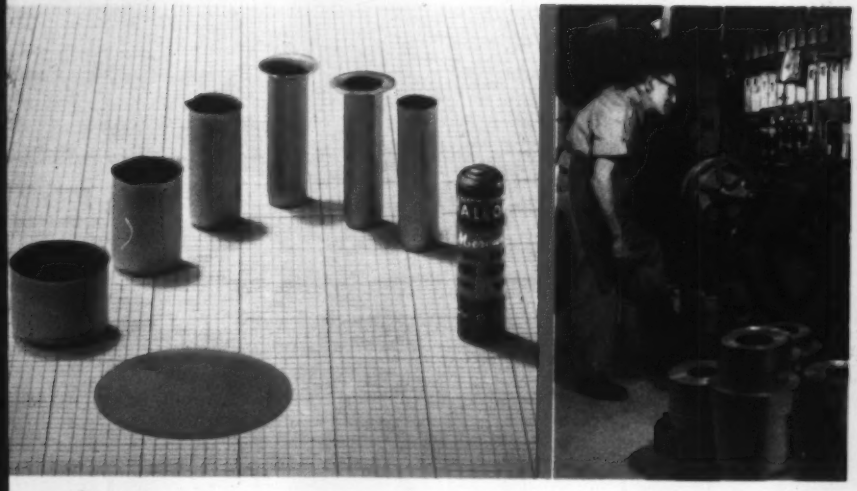
If you need more convincing, detailed literature and samples are yours for the asking.

Better yet, contact one of the Thomas Strip District Sales Offices on the last page and ask for engineering or design help. And tell them you'd like to see our new slide film, "Bright, Modern Metals Provide Proof of the Pudding."

Accordion Doors—Plastic Coated Thomas Strip replaced hand laminating for "lead rail" of STEELITE plastic folding doors made by Clopay Corporation, Cincinnati, Ohio. Strip is roll formed with six 90° bends, ribbed and punched for rivets and door handle. Plastic endures stretching and compression. Also maintains "perfect lamination" to pass 100% inspection, says Purchasing Agent Lewis H. Washburn. Formed rails (left foreground) are assembled on rivet bench.



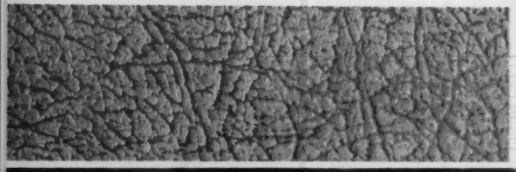
Boiler Tops—Lacquered Strip is spun formed by Edwards Engineering Corp., Pompton Plains, N. J., for boiler tops and top collars in packaged heating systems. Lacquer coat on Thomas Strip's aluminum-killed, drawing quality steel adheres without chipping or peeling. Edwards also uses lacquered strip to roll form back plates and front shields for baseboard units. Purchasing Agent John Bush says: "Thomas is more flexible and cooperative in giving us a quality product. We cut six steps, gained 1,500 sq. ft. of work space and eliminated fire hazards when we switched to prepainted strip. But most important, we can custom cut baseboard units to extra long lengths from prepainted coils." Edwards buys .029″ strip lacquered white on one side in 10.500″ and 5.625″ widths; 23″ width, beige lacquered on two sides.



Battery Cans—Nickel Coated Thomas Strip is used by Cly-Del Manufacturing Co., Waterbury, Conn., to produce mercury battery cases for P. R. Mallory Co. Example: RM-502 inner can, drawn by an Eyelet process from 2¼″ by .010″ strip. AK, non-scalloping steel with .000125″ nickel coat both sides must produce can 1.776″ by .506″ O.D. without draw rings, burrs, earing, peeling or flaking. Thomas has supplied nickel coated strip to Cly-Del nearly 20 years. "Precoated strip does this job better than if we plate after forming," says Purchasing Agent Raymond W. Drufva. "There's not much competition for Thomas in nickel coated strip for close tolerance work. It's the only producer able to supply the material we need for these battery cans."

Lipstick Bases—Copper Coated strip means a ⅔ material cost saving for Truelove & Maclean, Inc., Waterbury, Conn., Eyelet stampings specialists. Normally a brass part, a single style of this drawn shell, is produced at rate of 5 million yearly. Firm buys AK, non-scalloping, close gage (±.0005″) copper coated Thomas Strip for ductility, die lubricating and finish plating properties. Co-owners Tom Truelove and Don Maclean say: "We wouldn't attempt some of these jobs unless the material was copper coated steel. Generally it's no harder to work steel than brass when the steel is Thomas Strip's copper coated. There's not much competition for Thomas in this line." (Top photo shows copper coated lipstick bases being packaged with magnetic lifter.)

PATTERN ROLLED STEEL OFFERS UNLIMITED DESIGN OPPORTUNITIES



Home Mailboxes—Pattern Design. The Lady was looking for product appeal. She found it in pattern design sheet from Pittsburgh Steel Co. The Lady is Miss Jeanette L. Troy, director of purchases for The Randall Co. of Cincinnati, Ohio. She explains: "We were trying to find something new for our colonial style home mailboxes—a decorative effect that was different. Pittsburgh Steel's Pattern Design No. 101 gave us the appeal boost we were looking for—and without a proportionate cost boost."

Randall, a division of Textron Inc., produces the boxes for another Textron division, Wagner Manufacturing Co. of Sidney, Ohio. Industrial Engineer Wade Hartman says pattern design sheet saves 50 cents over a mailbox made of similar patterned materials. Rolled-in leather design shows no distortion in forming; permits full thickness of steel to be used in blanking, forming machines. Randall buys pattern sheets in commercial quality .024″ thick and in widths 39⅝″, 40¼″, 42⅞″.

Cabinet Hardware—Pattern Design—Thomas Strip's antique patterned steel helps Ajax Hardware Corporation of Los Angeles build strength and beauty into Early American cabinet hardware. President Norman D. Louis says: "Thomas Strip saves many hours by eliminating production steps. The uniformity of appearance, quality and workability of Thomas Strip's patterned steel makes it possible to match Ajax Early American cabinet hardware year after year. Production is fast because of Thomas Strip's close tolerances and formability." Ajax Hardware gives Thomas Strip's uncoated strip an electrolytic coating of rich antique copper or dull black. Photo shows packaging operation.

THOMAS STRIP DIVISION

Pittsburgh Steel Company

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Denver	Earle M. Jorgensen Co.*†•
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GEORGIA	
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Indianapolis	The Peninsular Steel Co.†
KANSAS	
Wichita	Earle M. Jorgensen Co.*†•
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Detroit	Alloy Steels, Incorporated†
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	The Peninsular Steel Co.†
	Joseph T. Ryerson & Son, Inc.†•
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St. Louis	Ford Steel Company†
	Joseph T. Ryerson & Son, Inc.*•
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Englewood	Tubesales•
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	Service Steel Division Van Pelt Corp.•
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Charlotte	Joseph T. Ryerson & Son, Inc.†•
OHIO	
Akron	The Peninsular Steel Co.†
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	Joseph T. Ryerson & Son, Inc.†•
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	SAE Steels, Inc.*
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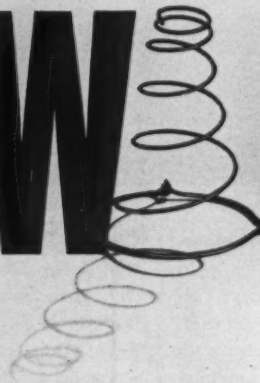

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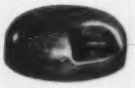

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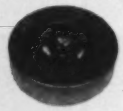
Stamped Machine end cover

OFFICE MACHINES
Stamped whiteprinter housing



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Forged part

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Stamped tractor grill

SPORTS EQUIPMENT
Stamped Pinsetter part

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Stamped radar base

CONSTRUCTION EQUIPMENT
Forged steering spindle

ROAD BUILDING
Forged track link

37 INDUSTRIES BENEFIT FROM T & W's WIDE RANGE FACILITIES, EXPERIENCE

You benefit, too, from the broad range of T & W's equipment, ability, experience. Whether you need a big part or a little one, a smoothie practically ready for the plating tank or a rough tough component for a bulldozer, we can help you get it. T & W has the machines, the men, the experience, and the knowledge of how to fill your needs, that you are looking for. We sum this up as "T & W Technique," and we will be glad to explain how it serves American industry with forgings and stampings which cost less at the point of assembly.

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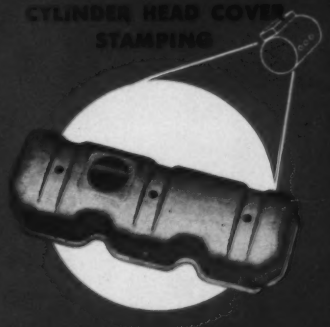

This cover, 18" long, 9⅝" wide, 4¼" deep, benefited from the wide ability of T & W in producing rugged, non-warping items of similar complex design.

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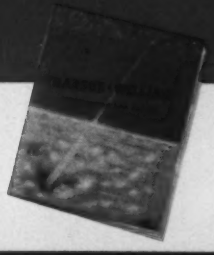

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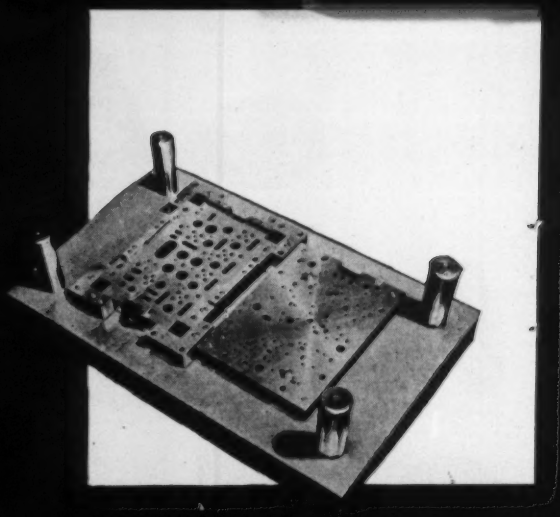


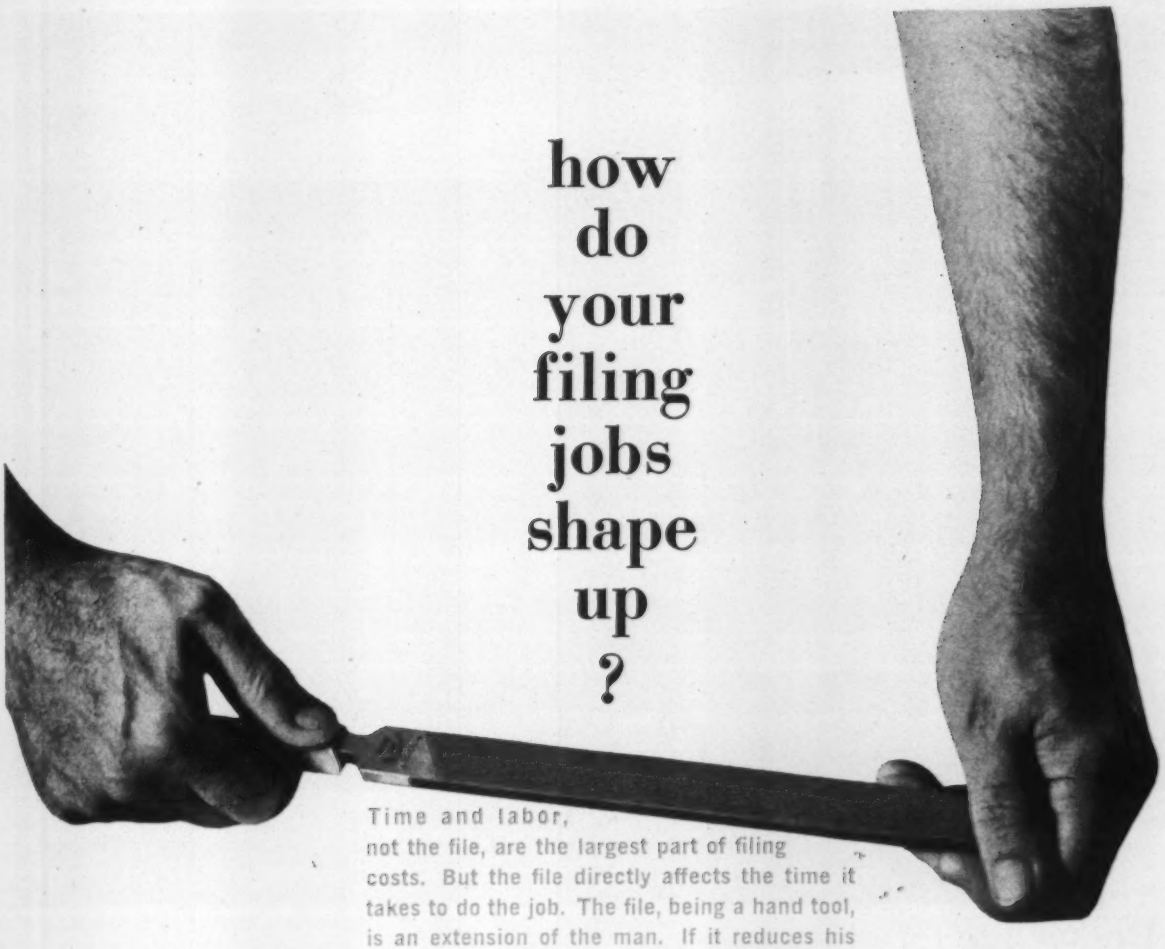
only **vega** Pat. No. 2355224 offers you all these advantages

order after order after order... minimum size change and distortion... low temperature heat treating... uniform deep hardenability... freedom from scaling... good machinability... exceptional toughness with good hardness... no preheating in hardening. From start to finish you enjoy exceptional simplicity and safety and predictable performance. Produced by the MEL-TROL® Process... Only Carpenter VEGA-FM assures such uniformity of benefits. Use this MATCHED SET of Air-Hardening Tool and Die Steels—VEGA-FM (Type A-6), No. 484-FM (Type A-2), and No. 610-FM (Type D-2)—for proper selection and consistently better results. Call your Carpenter SERVICE-CENTER for prompt delivery.

Carpenter **steel**

you can do it ***consistently*** better with Carpenter Tool and Die Steels

The Carpenter Steel Company, Main Office and Mills, Reading, Pa.
Alloy Tube Division, Union, N. J.
Webb Wire Division, New Brunswick, N. J.
Carpenter Steel of New England, Inc., Bridgeport, Conn.



how do your filing jobs shape up ?

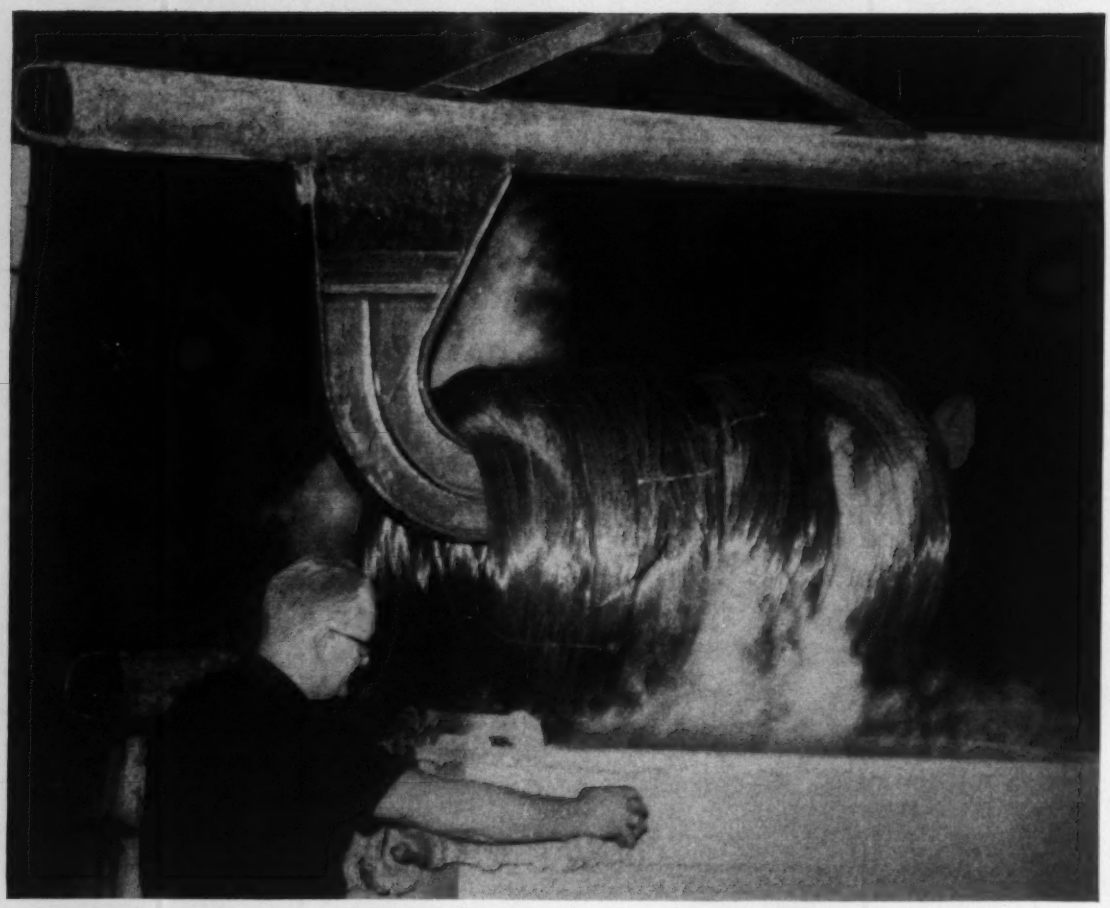
Time and labor, not the file, are the largest part of filing costs. But the file directly affects the time it takes to do the job. The file, being a hand tool, is an extension of the man. If it reduces his skill, the work suffers and costs go up. But if the file matches a worker's skill, he becomes more productive and therefore, costs go down. Nicholson and Black Diamond files are preferred by the majority of industrial purchasers. They're top quality to produce a quality job. They match a worker's skill. There are 6000 different types, shapes and sizes . . . one that's precisely right for your job. And they wear well, thereby reducing your tool replacement costs. Your Nicholson or Black Diamond Distributor* will be glad to help you with your filing problems, help select the right file for your job.

* Industrial Distributors provide the finest goods and services in the least possible time. Our products are sold exclusively through them.

NICHOLSON

NICHOLSON FILE COMPANY, PROVIDENCE 1, RHODE ISLAND

FILES · ROTARY BURS · HACKSAW AND BAND SAW BLADES
GROUND FLAT STOCK · INDUSTRIAL HAMMERS



Puzzle Picture:

Can you find anything that needs fixing on this 12-year-old Monel pickling hook?

If you can't find anything wrong, you're in good company! Last inspection at the Worcester, Mass. plant of Reed & Prince Manufacturing Company showed very little wear, no need for repairs on this hook – and five others like it.

It's been this way since 1948. The Monel* nickel-copper alloy hooks, built by Youngstown Welding and Engineering, have spent the last twelve years swinging loads into a 5% to 8% sulfuric acid bath at 160° to 180°F. Yet even today no repairs are indicated, not even minor welding.

Outstanding resistance to sulfuric acid pickling solutions *plus* remarkable strength and ductility... this is the unique combination you get with Monel* alloy. It's actually stronger than structural steel.

You can carry bigger payloads, since there's less deadweight... no need for extra metal to offset corrosion. And Monel alloy – strongest non-ferrous pickling equipment metal – withstands "shock loading." Its toughness and ductility enable it to resist rough handling.

Monel alloy pays its way in other pickling equipment, too

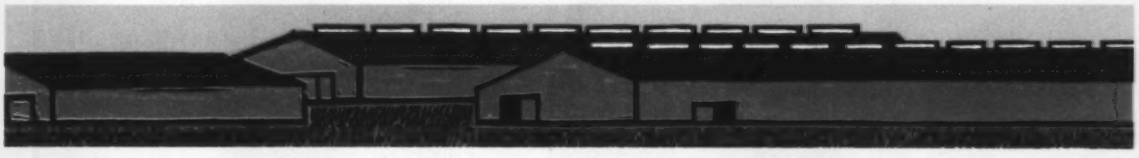
Monel alloy can mean extra life in chains, slings and tierods... fine workability and easy welding properties in fabricated equipment like crates, baskets, and racks.

You can get full information in the useful 32-page booklet "Equipping the Pickle House for Greater Production at Lower Cost." We'll be glad to send you a copy. And let us know your problems with materials that work in corrosive atmospheres. Perhaps we can help you find practical answers. *Inco trademark

HUNTINGTON ALLOY PRODUCTS DIVISION
The International Nickel Company, Inc.
Huntington 17, West Virginia

MONEL®

RISING FAST IN MID-AMERICA—
MIDWEST STEEL CORPORATION



Above, with the big "M" in it, you see the trademark of Midwest Steel Corporation, a new division of National Steel Corporation, now nearing completion in the heart of the metalworking industry of Mid-America.

It stands for a new, ultra-modern flat-rolled products plant—the most efficient and advanced in the country—soon to swing into operation on the Indiana shore of Lake Michigan.

It stands for a new look in steel plants, for handsome, green buildings and grounds . . . clean and well cared for.

It stands for new standards in steel products and for the finest steels: electrolytic tin plate, galvanized coils and sheets, hot- and cold-rolled sheets.

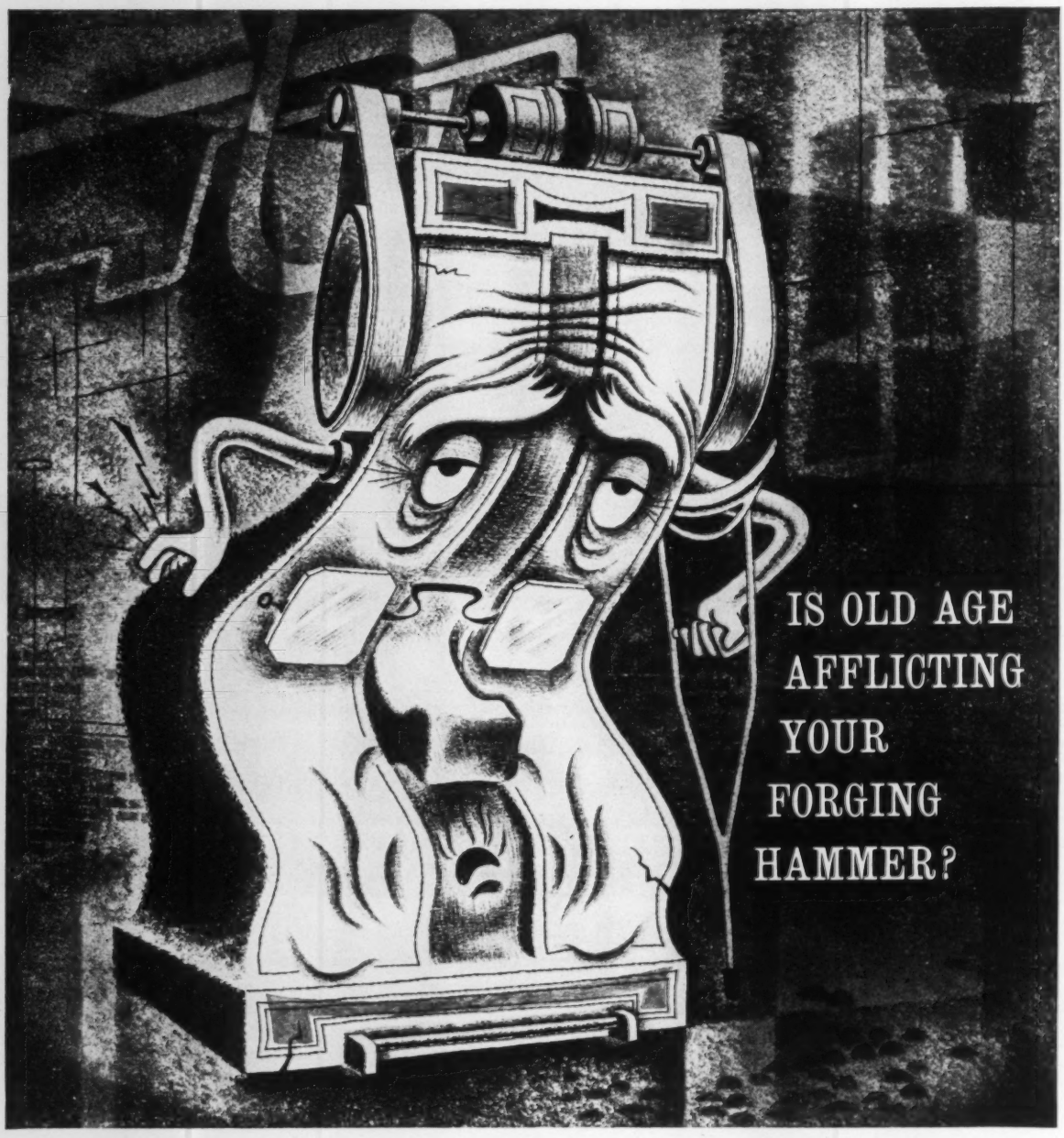
It stands for outstanding service, for new and economical solutions to your problems, for expert assistance whenever you need it.

It stands for a direct pipeline from our door to yours via waterways, railroads and highways.

Early in 1961, we'll be ready to roll. And the vast metalworking area ringing Chicago will have a new supply of quality steel on its doorstep. Midwest Steel will be in business, producing more muscle for Mid-America.

MIDWEST STEEL
Portage, Indiana

Midwest Steel is a division of **NATIONAL STEEL CORPORATION**



Add years to your hammer's life; improve performance with ERIE FOUNDRY REBUILDING SERVICE

Here at Erie Foundry we rejuvenate "old" forging hammers. First, we re-machine worn surfaces, true bearings, replace broken parts, repair cracked parts. Once the hammer is reassembled, tested and put back in operation, it's as spry and sound as a new machine—but at one-third the cost!

Stands to reason that the leaders in forge manufacture for over 60 years should be the best source for forge repair.

Regardless of who made it, or how badly it's cracked, broken or worn, your forging hammer will recover most quickly at Erie Foundry's Rebuilding "Hospital." Write for the complete story.

ERIE

ONE OF THE GREAT NAMES
IN FORGING SINCE 1895

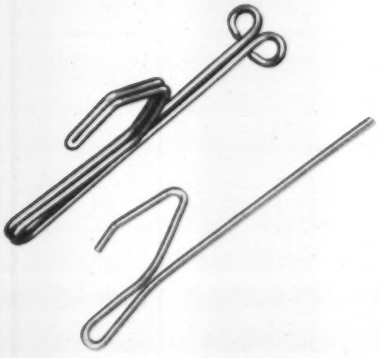
ERIE FOUNDRY CO., Erie, Pa.

Manufacturers of Forging Hammers • Forging Presses • Hydraulic Presses • Trimming Presses

EF-60-02

SOLD BY THE MILLIONS

KEYSTONE MB SPRING WIRE STUDY



Western Newell Mfg. Co. also supplies a complete line of drapery hooks made from Keystone Forming Quality Wire.

Newell

depends on KEYSTONE WIRE in the production of low-cost spring sash rods

To mass produce low-cost items that sell by the millions to retail stores coast to coast, calls for a quality product with top eye appeal for customer acceptance. Western Newell Mfg. Co., Freeport, Illinois, branch of The Newell Companies, manufactures many such items, including the spring sash rod illustrated. Keystone Drawn Galvanized MB Spring Wire permits continuous, mass-production runs without rejects . . . essential for profitable operation.

Says John H. Hepner, Purchasing Agent for Western Newell, "Keystone helps us produce a better sash rod through their close cooperation in developing and maintaining a wire most suitable for our use."

The most important requirements for manufacturing their sash rod are uniformity of temper throughout the coil, plus the superior silver brite luster of Keystone Drawn Galvanized MB Wire.

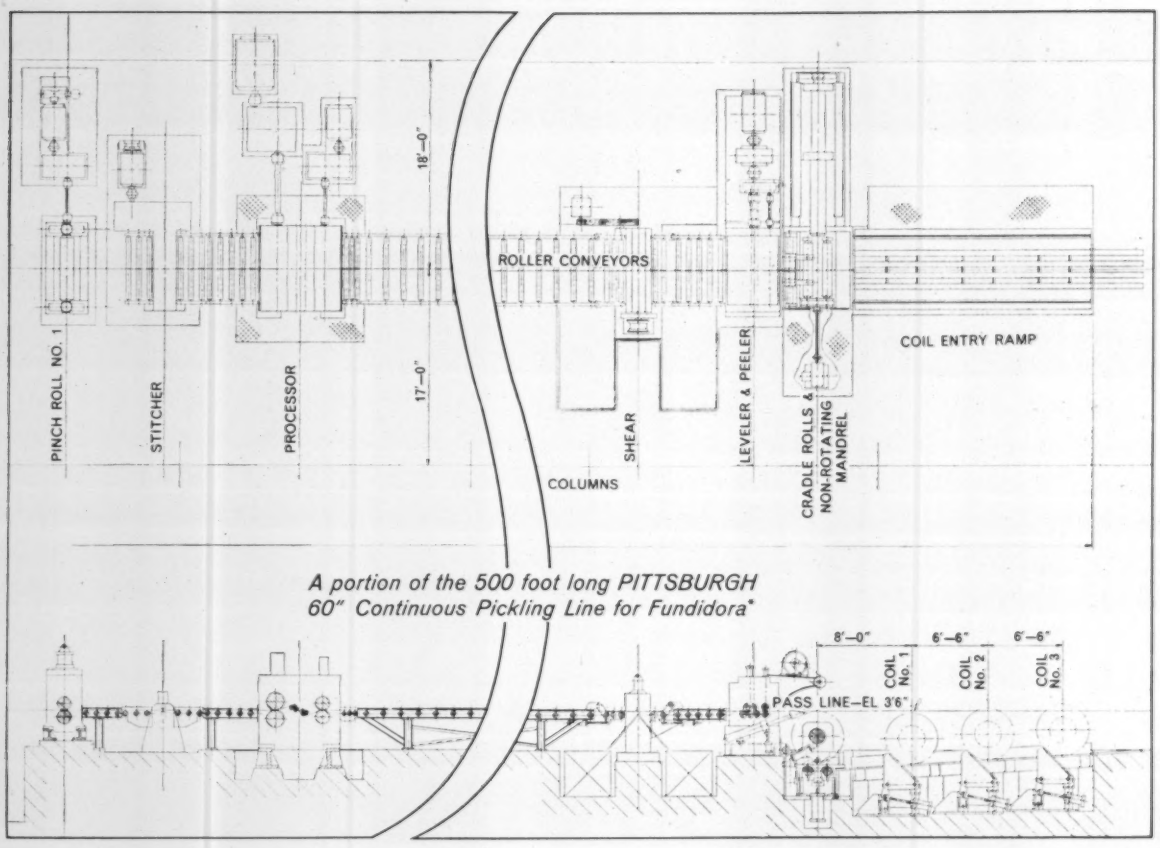
Keystone metallurgists carry on a continuous research for better spring wire so that Western Newell can hold a cost advantage. Such service has made this company a long-time user of Keystone MB Spring Wire.

You, too, can take advantage of Keystone's experience to mass produce your product with wire. For more information, talk with your Keystone Wire Representative. He will be pleased to serve you.

Keystone Steel & Wire Company, Peoria, Illinois

KEYSTONE

WIRE FOR INDUSTRY



*A portion of the 500 foot long PITTSBURGH 60" Continuous Pickling Line for Fundidora**

Fundidora* Chooses a PITTSBURGH Continuous Pickling Line in its Plant Expansion Program

A PITTSBURGH 60" Continuous Pickling Line has been specified for expanded plant facilities at Cia Fundidora De Fierro y Acero De Monterrey, S. A.* as part of the company's multi-million dollar expansion program to meet the growing demand for steel in Mexico. This installation is typical of the primary and auxiliary rolling mill equipment PITTSBURGH designs and manufactures for the steel industry to exacting customer requirements. We can help you in your requirements. Your inquiries are invited.

Electric and open hearth steel castings from 1 lb. to 100 tons

PITTSBURGH
ENGINEERING & MACHINE DIVISION
Pittsburgh Steel Foundry Co., Textron Inc.

564 FORBES AVE., PITTSBURGH 19, PA. • PLANTS AT GLASSPORT AND McKEESPORT, PA.

STEEL
The Metalworking Weekly

Metalworking Week®

November 7, 1960

Economists See Dip, Recovery by Mid-1961

A survey of 327 economists by F. W. Dodge Corp. finds the consensus to be "a mild dip followed by recovery in mid-1961." Here are the median expectations for selected indicators: **Gross national product**—$507 billion in 1961's second quarter; $515 billion in '61's final quarter. **Industrial production**—From 109 (1957 = 100) in June, 1960, to 108 in December, to 107 by June, 1961, to 110 by the end of '61. **Consumer prices**—128 in December, 1961—barely 1 per cent above mid-1960. **Wholesale prices**—By December, 1961, will rise 0.5 per cent above the June, 1960, mark. **New construction**—To dip slightly to seasonally adjusted annual rate of $54.9 billion in this year's second half, then rise to $56 billion in 1961's second half. **Housing starts**—Annual rate of 1.25 million in second half of '60, 1.3 million in first half of '61, 1.35 million in 1961's second half. **Plant and equipment outlays**—1961 rate down 5 per cent from the current level. **Personal consumption expenditures**—From $330 billion this fall to $332 billion in first half, 1961, to $336 billion in second half of '61. **Interest rates**—Relative stability through '61.

Bethlehem Will Study Price Situation, Says Homer

More and more steel company executives are making public statements about the need for a steel price increase. That is generally interpreted in the industry as a method of checking on consumer sentiment. A statement issued by A. B. Homer, chairman, Bethlehem Steel Corp., said his company is going to make a careful appraisal of the price situation after the next wage hike on Dec. 1. He looks for little change in his company's operating level during the fourth quarter vs. the third.

Investment Firm Finds Cross-Country Optimism

If the stock market were an accurate thermometer of the nation's economic health, "we would be in a hell of a fix," one banker told Merrill Lynch, Pierce, Fenner & Smith Inc., in that firm's personal poll of 270 businessmen across the nation. The investment firm found that our "fix" is not that "hellish." In fact, 196 of the businessmen look for higher sales and profits before April, 1961. Another 50 think business will be unchanged and 24 expect a decline.

Congressional Report Hits Procurement System

The Joint Economic Subcommittee on Defense Procurement, in a special report, has criticized general military purchasing as wasteful and has called for immediate consolidation of many common supply activities into one Pentagon purchasing agency. The subcommittee, headed by Sen. Paul Douglas (D., Ill.), has charged the armed services with "jockeying" for control of electronics procurement. The report notes that a specially legislated stand-

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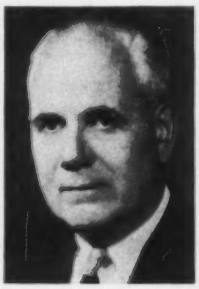
ardization program is not in effect, largely due to the multiplicity of semi-autonomous agencies and lack of over-all direction and control.

Armco's Johnston Urges Depreciation Reform



Logan T. Johnston, president, Armco Steel Corp., is urging the accounting profession to lend its knowledge and prestige to industry's efforts to revise U. S. depreciation policies. He says: "We simply cannot afford to modernize fast enough to keep pace with our foreign competitors and at the same time maintain a fair rate of return. Depreciation allowances, which do not recognize the effects of inflation, are largely responsible." He also declares that higher tariffs and other artificial restrictions will not solve our foreign competition problem.

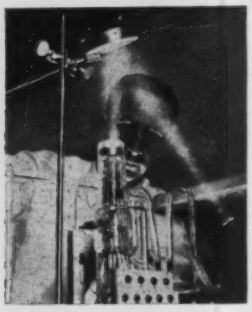
Engineer, Scientist Demand Rises

Demand is on the upswing for engineers and scientists. So finds the latest survey by Deutsch & Shea Inc., manpower consulting firm. It says demand rose more than 10 per cent from August to September. August demand was slightly below that of July.

Electronic Engineers Scarce; Demand to Soar

Demand for electronic engineers is at a record high and will climb more, finds a survey by Cadillac Associates Inc., Chicago. Demand for "systems oriented engineers in military electronics" is running 30 per cent ahead of a year ago. And demand for microminiaturization and component engineers is up 20 to 25 per cent. Demand for experienced computer engineers is up 40 per cent "with cannibalism the rule and the salary range up to $30,000," says the firm.

New Way to Measure Ultralow Pressures



A new tool to measure pressures less than one-thousandth of one-billionth of atmospheric pressure has been developed by Westinghouse Electric Corp. researchers. Called the photomultiplier ion gage, it uses a beam of ultraviolet light instead of the conventional hot surface to produce required ionization of the gas. The device is being used in pressure measurements aimed at understanding the concentration and interaction of particles in outer space.

The Embargo on Cuba: How Effective?

Industry observers think the U. S. embargo on Cuba, while partial, will cause some shortages in the island regime. Our share in Cuban imports will soon dip below 25 per cent—perhaps to 15 per cent—from the once normal 75 per cent. But Cuba does have other supply sources. Even nations receiving U. S. aid (like Egypt, Morocco, Yugoslavia, Poland) will be able to ship their

products to Cuba. And Russia is likely to give greater assistance. S. J. Rundt, consultant on international business, says a Cuban trade mission was in Canada last week and "Che" Guevara has left for Moscow. Mr. Rundt also reports that "there are agencies of our government actively engaged in helping the anti-Batista foes of Castro."

Wheeling's Kirkpatrick Hits Attitude of U. S. Youth

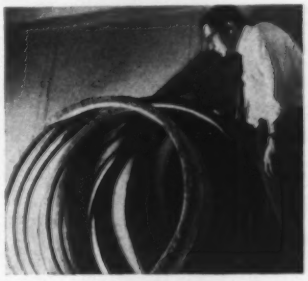
Forrest H. Kirkpatrick, assistant to the president, Wheeling Steel Corp., urges that we find a way to make the young people of this country believe that preparation for adulthood is more than just getting ready to earn a living with its bourgeois overtones of security, complacency, and suburbia. "It is not easy for our youth, growing up in the midst of abundance, in an essentially successful society, to recognize the need for struggle, hard work and privation in striving for a better future," he points out.

Appliance Upturn Arrives

The long awaited upturn in appliance sales appears to have arrived at last. Factory sales of domestic gas ranges in September rose 10 per cent above the August level. September sales of electric ranges reached the highest mark since March. And September sales of home laundry appliances surged 30 per cent above the August level. But, in most cases, sales still lag the year-ago level.

Researchers Check Flutters in Earth's Magnetic Field

Dr. R. A. Santirocco, Stromberg-Carlson astrophysicist, examines loop antennas which he and two associates will use to study variations in the earth's magnetic field. Each loop contains about 12 miles of copper magnet wire. The researchers will make tape recordings of magnetic waves to find the cause of magnetic disturbances that interfere with radio and wire communications.



Capital Outlays Abroad Are Up

Look for capital outlays abroad by U. S. companies to reach $3.9 billion this year vs. $3.7 billion last year. The Commerce Department says manufacturing companies will spend $1.3 billion abroad this year, 15 per cent more than last year, led by a rise of more than 30 per cent in Europe. In the Common Market countries, capital spending by U. S. manufacturers is now probably at a record rate. In Latin America, large outlays are in progress for chemicals, transportation equipment, and electrical machinery.

Union Gives In on Work Rules

The Longshoremen's Union on the West Coast has promised to allow employers almost complete freedom in determining how ships will be loaded and unloaded. It will permit more efficient loading methods and may reduce

sizes of some crews. In return, the employers have agreed to put $5 million annually into a fund to be paid out to workers if weekly hours are cut below 35, and to provide pensions for workers over 65.

Homing Pigeons Become Order Takers

The steel business hasn't gone to the dogs; it has gone to the birds. Interstate Steel Co., Chicago service center, is using homing pigeons to deliver orders from seven Midwestern cities to its home office. Says President H. R. Conant: "We want to find out if we can feather our nest." But he broods: "Suppose our competitors get word of it and shoot down our sales orders?" At any rate, bird seed costs less than steak on the expense account.

Montana Will Get a Steel Mill

As reported by STEEL (May 30, p. 27), Webb & Knapp Inc., New York, will build a steel mill at Anaconda, Mont. (annual capacity: 350,000 tons). The firm has signed a 20 year contract for electric power (120,000 kw) with the Bonneville Power Administration. Half the juice will be turned on July 1, 1963, and the rest by Nov. 1, 1963. The Strategic-Udy process will be used.

New, Bright Stainless Is Available

Allegheny Ludlum Steel Corp. is producing, in commercial tonnages at two locations, a new, bright annealed, stainless steel with a mirror finish, and the company claims, "improved corrosion resistance." AL and its subsidiary, Wallingford Steel Co., are offering the product at the same price as conventional stainless.

Straws in the Wind

Outboard Marine Corp., Waukegan, Ill., is developing an outboard gas turbine engine for the Navy . . . Birdsboro Corp., Birdsboro, Pa., will design and build a shear specifically for cutting up spent nuclear fuel elements . . . Members of the National Association of Suggestion Systems paid $14.4 million last year to employees for their ideas . . . Joseph Germano, Chicago-Calumet-Gary district director of the United Steelworkers, is urging an immediate cut in the workweek to 30 hours.

Metalworking Pulse

The Business Trend: STEEL's industrial production index normally rises in October. But, at a preliminary 154 (1947-49=100) for the week ended Oct. 29, it changed little from the level prevailing throughout the month. **Autos:** Since mid-October, output has fallen short of schedules, mostly because much Saturday work has been cut out. **Steel:** Mills scheduled production last week below the 1.5 million ton level for the first time since Labor Day.

- **INDUSTRIAL PRODUCTION**
  - Week ended Oct. 29 . . . 154†
  - Year ago 115
  - Details on Page 91
- **PASSENGER CAR PRODUCTION**
  - Week ended Nov. 5 . . 145,000*
  - Year ago 66,451
  - Details on Page 88
- **INGOT PRODUCTION RATE**
  - Week ended Nov. 6 . . 51.7%†
  - Week ago 54.2%
  - Details on Page 146

†Preliminary. *Estimated.

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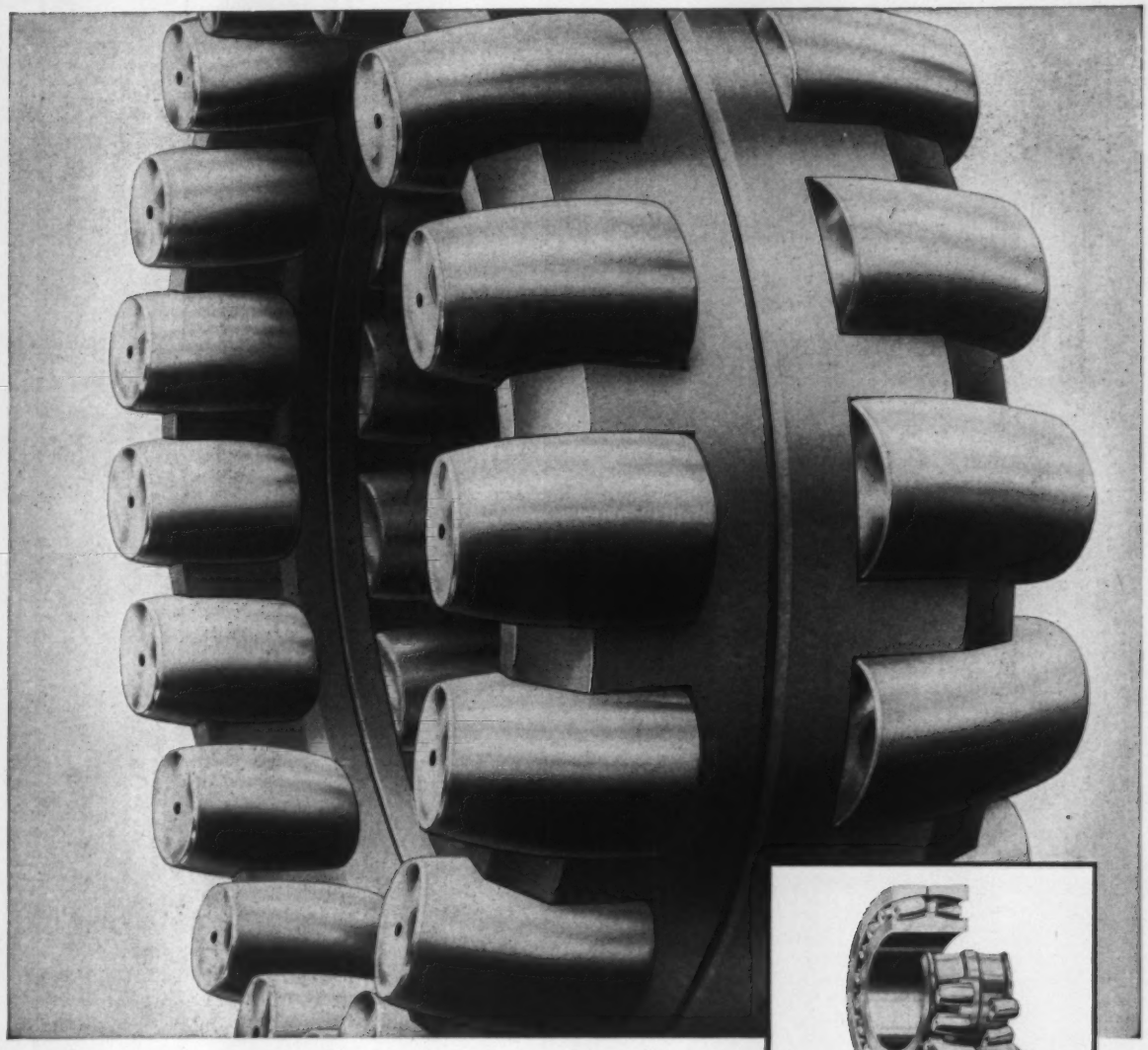


Superior design features of TORRINGTON SPHERICAL ROLLER BEARINGS

- integral guide flange for roller stability
- asymmetrical rollers seek flange for positive guidance
- electronically matched rollers
- size-stabilized races
- fully machined land-riding bronze cages
- controlled internal clearances
- even load distribution
- inherent self-alignment
- long service life

"Caged" for Longer Life!

The two land-riding cages in Torrington Spherical Roller Bearings assure proper roller spacing and guidance, even under rugged conditions of shock load and sustained high speeds. These fully machined cast bronze cages operate independently. Their design eliminates drag on rollers. These high-strength cages help bearings give longer life by providing low friction, smooth running and cool operation. Highly effective and generous lubrication of all contact surfaces is achieved with the open-end cage design.

The result: Torrington Spherical Roller Bearings are built to give extra years of unmatched service life in heavy-duty applications. Torrington's long experience in design, engineering and manufacture of every basic type of anti-friction bearing provides the finest spherical roller bearings available. You'll find it pays to standardize on Torrington.

progress through precision **TORRINGTON BEARINGS**

THE TORRINGTON COMPANY South Bend 21, Indiana • Torrington, Conn.

ARMCO STEELS / for better products • lower costs

New steels are born at Armco

Armco ZINCGRIP Steel

Takes Deep Drawing, Thread-Rolling, Stamping and Forming without damage to coating

Galvanized Steel

Your company may not make thread protectors but the reasons why Armco ZINCGRIP Steel proved to be the most efficient, lowest cost material for this product may prove of interest to *you*. ZINCGRIP was selected because:

It provides the strength and rigidity of steel.

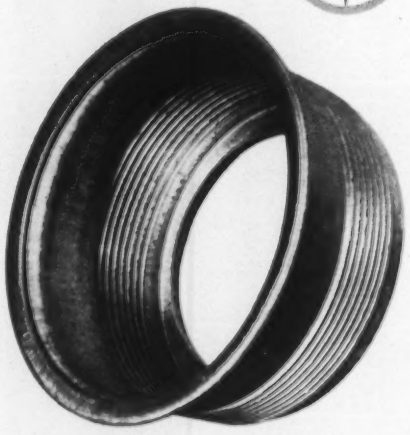
The special hot-dip zinc coating won't flake or peel despite the severest working.

Fabrication is done on standard production equipment.

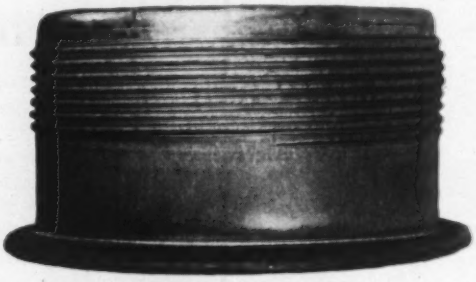
The full-weight zinc coating provides the most economical protection from rust and corrosion. Costs less than painting or plating.

These are reasons why Armco ZINCGRIP Steel has been used by thousands of manufacturers for more than a quarter-century. They also are reasons why this special zinc-coated steel may help *you* cut costs and improve the performance of your products.

Let us send you complete information on Armco ZINCGRIP Steel so that you can thoroughly evaluate its advantages in your programs to increase materials-efficiency and lower production costs. Just write Armco Steel Corporation, 3020 Curtis Street, Middletown, Ohio.



Protective cap for threaded pipe made of .0456" Armco ZINCGRIP Steel. Note the excellent adherence of the zinc coating on this deep drawn part, especially on the sharp bends and the rolled threads.



ARMCO STEEL

ARMCO

Armco Division • Sheffield Division • The National Supply Company • Armco Drainage & Metal Products, Inc. • The Armco International Corporation • Union Wire Rope Corporation

Revolution in Materials!

Producers of steel, nonferrous metals, plastics, and other materials have launched an intensive drive to protect and expand their markets by introducing new and more versatile products.

Many of the developments are resulting from competition among various types of materials in this country and the encroachment of low priced imports.

In the container field, for instance, lower cost, ultrathin tin plate will compete with aluminum in cans assembled at orange juice packing plants.

In the construction field, new, high strength, lightweight, wide flange beams (up to 36 in. in depth) employing plastic design techniques will compete with prestressed concrete.

In the home appliance field, new, low carbon, enameling steels will compete with regular grade enameling stock in the production of stoves and refrigerators.

In the oil and gas field, 40 ft lengths of gas transmission pipe 42 in. in diameter will be produced on continuous fabricating lines to compete with smaller pipe made by other methods.

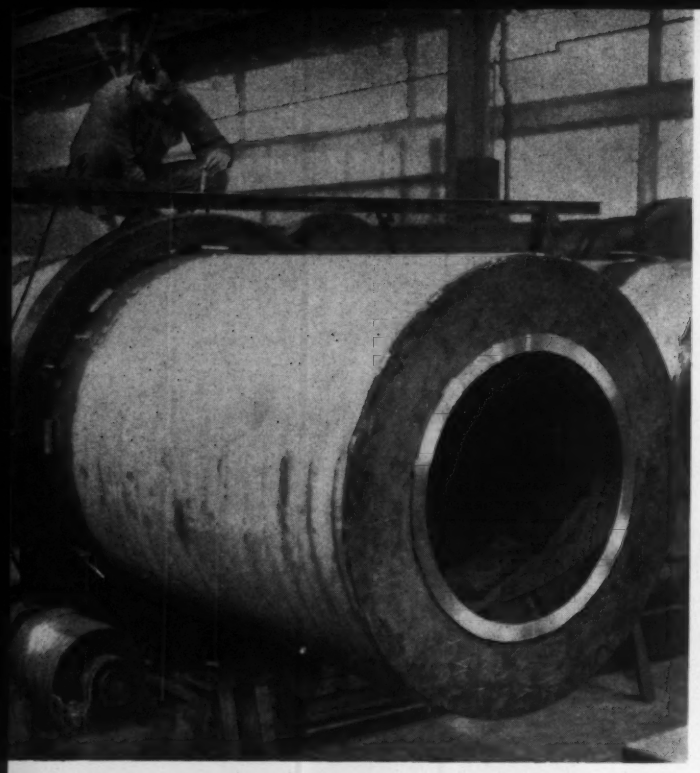
In the automotive field, cast aluminum is competing with cast iron for engine blocks, transmission housings, brakes, and other parts.

In the metalworking field as a whole, stainless steel, copper and brass, molded and laminated plastics, powdered metals, precoated metals, vacuum melted steel, ductile tungsten, and a host of other materials are competing for a share of a rapidly changing market.

Many are available in new shapes, sizes, and packages designed to reduce their initial cost to the buyer, increase unit production, reduce machine down-time, and cut scrap loss. Example: Steel in 70,000 lb coils.

What you are witnessing is a revolution in materials that's likely to have a terrific impact on your company's products.

Irwin H. Such
EDITOR-IN-CHIEF



... HOT

Temperature in this stainless steel rotary salt dryer will be 1600°F from combustion gases. It's used to demoisturize salt, one step in making high octane gas. C. O. Bartlett & Snow was the fabricator. They chose stainless steel because of its outstanding high temperature strength and resistance to high temperature oxidation.

COLD...

—443°F is only 16.4 degrees above absolute zero. That's one reason stainless steel is used in this heat transfer unit that helps simulate outer space conditions of near absolute zero temperature and one-billionth of an atmosphere. The all-stainless unit is named "PLATE-COIL," manufactured by Tranter Manufacturing, Inc., Lansing, Michigan.

USS Stainless Steels... no other metal makes such a material difference in so many applications

This mark tells you a product is made of modern, dependable Steel.

...and in between

No material can match stainless steel's versatility. Stainless steel offers designers and fabricators a unique combination of properties: superior strength, extraordinary corrosion resistance to an enormous variety of reagents, outstanding high temperature properties, and appearance. It is easily fabricated and, because stainless steel lasts longer, actually costs less in the long run. If you have a selection or delivery problem, ask your USS representative or nearest steel service center.

USS is a registered trademark

United States Steel Corporation — Pittsburgh
American Steel & Wire — Cleveland
National Tube — Pittsburgh
Columbia-Geneva Steel — San Francisco
Tennessee Coal & Iron — Fairfield, Alabama
United States Steel Supply — Steel Service Centers
United States Steel Export Company

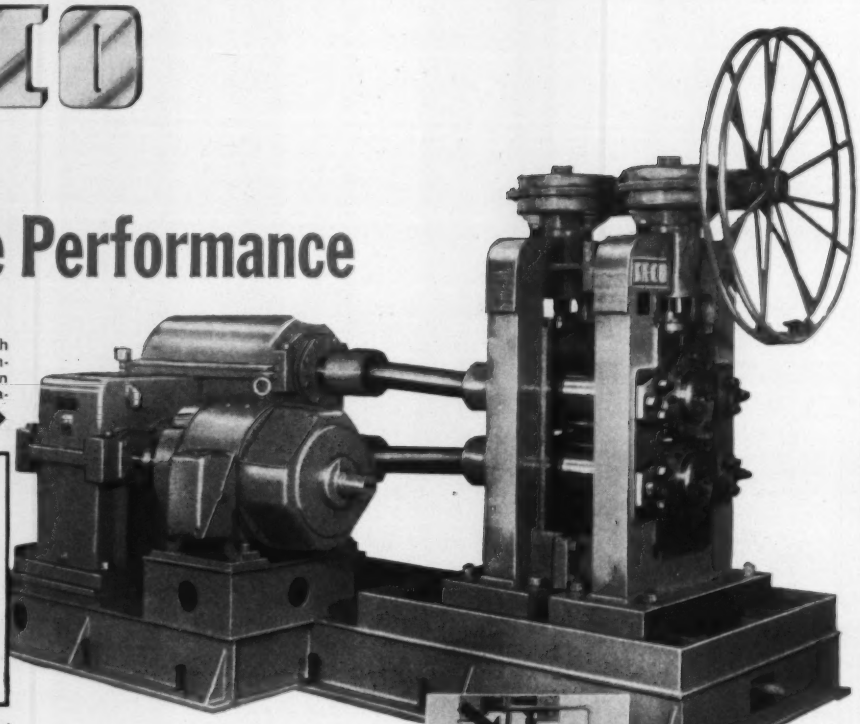
United States Steel

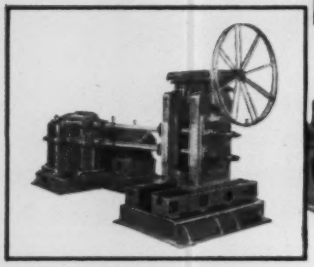
Whatever your requirements . . . SECO's staff of trained engineers can help you solve any special Mill problem you may have . . . from creative designing through installation (including *all* required auxiliary equipment).

Should your problem involve a special Cluster Mill (to accommodate either ferrous or non-ferrous metals), or a Hot Rolling Mill that bonds non-ferrous metal to a steel base . . . SECO can supply.

Custom Built
HOT ROLLING MILLS
by SECO
assures
Predictable Performance

A special, custom-built 2-high Hot Roll Flattening Mill for non-ferrous metals. (Can be built in 2 or 4-high types or a combination of both.) ▶

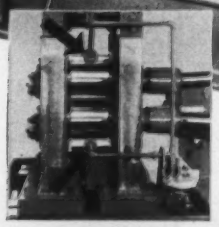




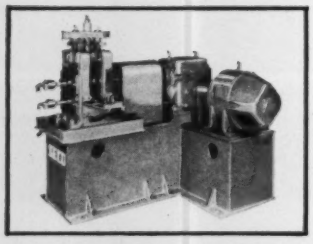
▲ A SECO designed and built Bi-Metal Bonding Mill on movable mountings.

Special Features: ▲

- Water-cooled chocks for lubrication
- 900° F. rolling temperature
- Hand wheel screw-down (adaptable for power)
- Special alloy steel rolls
- Timken Tapered Roller Bearings
- Can be built for 8, 10, 12 or 16-inch widths.



◀ Mill is equipped with two gas jets as a means for pre-heating rolls (see arrows).



▲ A 6-inch, 2-high Wire Flattening Mill for single or tandem use.

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Impact of The Machine Tool Exposition—1960 . . .

Show Goers Hike Spending Plans

MACHINE TOOL builders look for the fourth quarter to bring their first real upswing in business since early 1957.

It could be the best quarter the industry has had for some time, outgoing President Alan C. Mattison told the National Machine Tool Builders' Association last week. (He's also president of Mattison Machine Works, Rockford, Ill.)

True, September was disappointing. (New orders for metal cutting machines came to only $42.45 million.) And bookings were hardly in the boom category in October, but builders now feel that customers are in a buying mood. One big reason: The Machine Tool Exposition—1960 at Chicago in September.

• Optimism is confirmed by a STEEL survey of metalworking executives who attended the exposition.

Two-thirds of the respondents say they plan to spend more next year for machine tools than they will this year. (See results, right.) The average planned increase is 28 per cent.

More than a third of the managers say the exposition will be directly responsible for additional machine tool purchases this year. More than half say the exposition forced them to hike next year's planned expenditures.

The STEEL survey covered 1200 metalworking plants—100 in each of the top metalworking states. Questionnaires were addressed to only key managers who registered at the Chicago exposition.

• Even before the exposition started, most builders warned against expecting an immediate boom in orders. They were right.

67% of those surveyed by STEEL plan to spend more on machine tools in 1961 than they did this year. As a direct result of the show . . .

23% will increase 1961 appropriations.

35% will order more equipment *this year.*

58% will order equipment in the first half, 1961.

19% have already ordered equipment.

11% of those who have placed orders are buying at least one numerically controlled machine.

17% plan to buy some numerically controlled equipment between now and mid-1961.

Orders for metal cutting machines eased along at an average monthly rate of about $38 million during the second and third quarters. They jumped to $47.8 million in August (when buyers were supposedly waiting for the show), fell back to $42.5 million in September, and probably were only a shade better in October.

The spurt in August can be partially explained: Buyers were hedging against price increases that went into effect in September. Some of the orders weren't firm, which helps to explain why September was down.

After the exposition, $6.8 million of the not-too-firm orders were canceled, the highest rate in three

years. As one builder told STEEL: "Subtract some of September's cancellations from August, and that month better fits the pattern we would expect. At the same time, September would look better without those cancellations."

How fast orders will increase the rest of the year was the main topic of conversation at last week's annual meeting of the industry association. One turret lathe builder told STEEL his company anticipates that each month in the fourth quarter will bring about 10 per cent more new orders than the preceding month. If the industry could do as well, this year's new orders for metal cutting type machines could wind up at about $530 million—about $10 million over the 1959 volume.

Further, if survey respondents come through with a 28 per cent increase in orders next year, that business could put 1961 new orders at about $678 million, a good peace time year in the opinion of most builders.

• Numerical control impressed show goers, but many are hesitant about buying it.

Seventeen per cent of the survey respondents said they plan to buy numerically controlled equipment between now and mid-1961. Of those who have already bought machines as a result of the show, only 11 per cent purchased numerical controls.

In their comments to STEEL, many of the respondents said: "Although the tape systems were appealing, we felt reluctant to buy." They gave a dozen reasons but seemed particularly anxious for more information on how to apply the systems in their shops.

One builder of tape controlled machines says that reaction was expected. "The Chicago exposition introduced a lot of users to a concept that was little understood by many of them. If we whetted their curiosity, and if they follow through with their search for more information, the builders will be well on their way to establishing numerical control as a standard metalworking operation in all segments of industry. And that's precisely what we are trying to do."

Builders now bet that the exposition was timed right. Managers who went to the exposition agree: Machine tool business is ready for an upturn.

BUILDER'S VIEW

Everett M. Hicks, newly elected president, National Machine Tool Builders' Association, and vice president, general manager, Machine Tool Div., Norton Co., Worcester, Mass.:

"The Machine Tool Exposition—1960 was designed to demonstrate that machine tool technology has made some important strides in the last five years. Builders who exhibited were favorably impressed by the quality of executives who attended and by their genuine interest in what they saw. The results of STEEL's survey substantiate the fact that much of the interest shown in Chicago has already affected the users' plans for capital equipment buying. That's the significant result we hoped for."

Construction

CONSTRUCTION, which accounts for about 15 per cent of the gross national product, will support its share of the economy in 1961. New construction will hit a record $57.2 billion vs. $55 billion this year. Repair and maintenance will add another $19.5 billion.

Those predictions were made for STEEL by the Associated General Contractors of America. The AGC's preliminary forecast for 1961 shows private construction rising almost $2 billion above the 1960 mark; public construction will be up $350 million (see table). Private construction will be mainly responsible for carrying 1961 past the 1959 new construction record ($56.1 billion).

• Downturn Stopped?—AGC says its forecast is made with "considerable caution." The trade group's official forecast will be released about Jan. 1 when the figures for 1960 are firmer. But AGC sees nothing in the current picture to indicate a continuation of this year's downtrend in construction. It notes a leveling off during the last two months and thinks 1960 should wind up about $1 billion below the 1959 pace.

• Support for Optimism—Forecasts by structural steel fabricators at last week's convention of the American Institute of Steel Construction Inc. lend support. Fabricators expect an upturn of about 3 per cent in 1961.

Fabricated structural bookings this year will total about 3.5 million tons, up 9 per cent from 1959's and the best year since 1956 when 4.7 million tons were booked. Shipments will total 3.4 million tons this year and are expected to reach 3.5 million tons in 1961.

• Profits Pinch—While the present and anticipated tonnage volume is fair, fabricators complain bitterly about price cutting by their fellow steelmen. Close bidding on jobs—nothing new to the industry—has forced profits to a new low. A study of 115 fabricators by Robert Morris Associates shows 1959 profits, after taxes, were 1.62 per cent of sales. Some fabricators believe the 1960 picture will be even worse.

Outlook: 4% Increase for '61

Where Construction Money Goes

(In millions)

Type of Construction	1961*	1960*	1959
Private Construction	**$40,975**	**$39,100**	**$39,848**
Residential buildings (nonfarm)	23,500	22,100	24,469
Industrial	2,900	2,900	2,106
Commercial	4,300	4,050	3,930
Other nonresidential buildings	3,250	3,100	2,823
Farm construction	1,400	1,400	1,261
Public utilities	5,350	5,275	5,052
All other private	275	275	207
Public Construction	**16,300**	**15,950**	**16,257**
Residential buildings	800	800	962
Nonresidential buildings	4,700	4,600	4,514
Military facilities	1,200	1,200	1,488
Highways	6,000	5,800	5,916
Sewer and water systems	1,500	1,500	1,467
All other	2,100	2,050	1,890
Maintenance & Repair	**19,500**	**19,000**	**19,000***
Total	76,775	74,050	75,105

*Estimated exclusively for STEEL by Associated General Contractors of America.

Price fighting is only one of the problems in the steel fabricating industry. Competition from other materials—prestressed concrete, reinforced concrete, and wood—is keen. Fabricators are getting some help from the steel industry. Bethlehem Steel Co., for example, has just announced a new line of lighter wide flange structurals. They are expected to get prompt acceptance for structures using plastic design.

Here's the outlook for the major segments of construction.

• **Housing**—A decline this year prevented construction from hitting an all-time high. AGC feels the need for new housing plus the current easing of credit will account for an increase. Easier credit should boost all construction activity.

• **Highways**—This was one of the big problem areas in construction this year. "The new administration and the new Congress will take whatever steps may be necessary to put the highway program back on schedule," predicts AGC. A bigger highway program will spread over into other construction areas because new enterprises always follow new roads.

• **Industrial**—AGC believes "It is time that a substantial increase took place in expenditures for new plant and equipment." It reasons that surveys of businessmen's intentions made earlier this year showed such spending would match the all-time high of 1957; even though that situation did not materialize this year, the same needs for expansion still exist.

• **Sewage and Waste**—Plants for the treatment of sewage and waste represent only a small part of total construction, but this area illustrates the needs of the economy for continually increasing outlays for construction. The Public Health Service recommends the construction of 4000 new sewage treatment plants and the modernization of another 1700, a program which would cost $4.6 billion and take at least seven years. Another $2 billion, says the Health Service, should be spent on 6000 new projects for hauling industrial waste discharges.

Phenomenal growth in the face of tough competition. That's the story of Texas Instruments Inc., 31-year-old Dallas electronics firm. TI ranked 487th in size among U. S. industrial companies in 1957. It will be in the top 200 this year. Its sales have surged from about $2 million in 1946 to an estimated $235 million this year. TI's president, Patrick E. Haggerty (right), revealed some of the reasons behind his firm's growth—and effectiveness —at an Industrial Management Society gathering in Chicago last month.

8 Steps to Effective Management

"I BELIEVE that the average, overall effectiveness of the best managed U. S. companies is under 10 per cent," Patrick B. Haggerty, president, Texas Instruments Inc., told an Industrial Management Society seminar.

He arrives at his estimate this way: There are three basic functions in any technological business: 1. Creating the product (research, development, engineering). 2. Making the product. 3. Marketing the product. Mr. Haggerty believes that, roughly speaking, each of the three functions is a relatively equal component of net effectiveness. So overall effectiveness of any company can be surprisingly low (see chart at right).

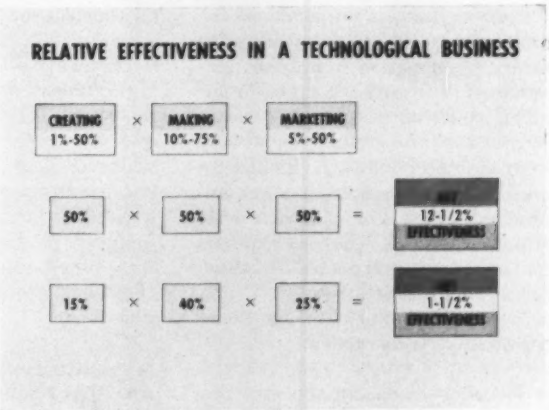
• **Need Is Urgent**—As Mr. Haggerty puts it: "Unquestionably, we now compete in the world, not solely within the boundaries of our country. Our manager counterparts abroad utilize workmen — whether skilled, unskilled, or professional — whose earnings are one-tenth to one-third of ours (see chart at top of Page 75).

"Further, these competitors are rapidly becoming as good at managing their enterprises as we are now. It is abundantly clear that if . . . the U. S. is to hold its position in the world economy, we must improve." Mr. Haggerty mentions eight ways U. S. executives can improve the effectiveness of their organizations . . .

1. Product Innovation

"We must create new products and improve old products at such a rate that we always have an appreciable segment of our product output which is so new and so striking in its usefulness that there simply is no question of our having to compete directly on a wage and salary basis," Mr. Haggerty declares.

He points out that the U. S. gross national product has increased at a rate of about 4 per cent a year since 1930, while research and development expenditures (including all engineering) have increased at a rate of about 10 per cent per year. TI's outlays have zoomed (see chart).



Mr. Haggerty estimates that the average company has an over-all effectiveness of about 1½ per cent. Figures in top row are his estimates of the range of TI's effectiveness in each of the three major industrial functions

2. Boost Productivity

"We must turn out a minimum of 3 to 6 times as much value in our products per hour of effort as do our competitors everywhere else in the world," Mr. Haggerty points out. He says mechanization and automation will help, but we've been replacing men with machines for a long time.

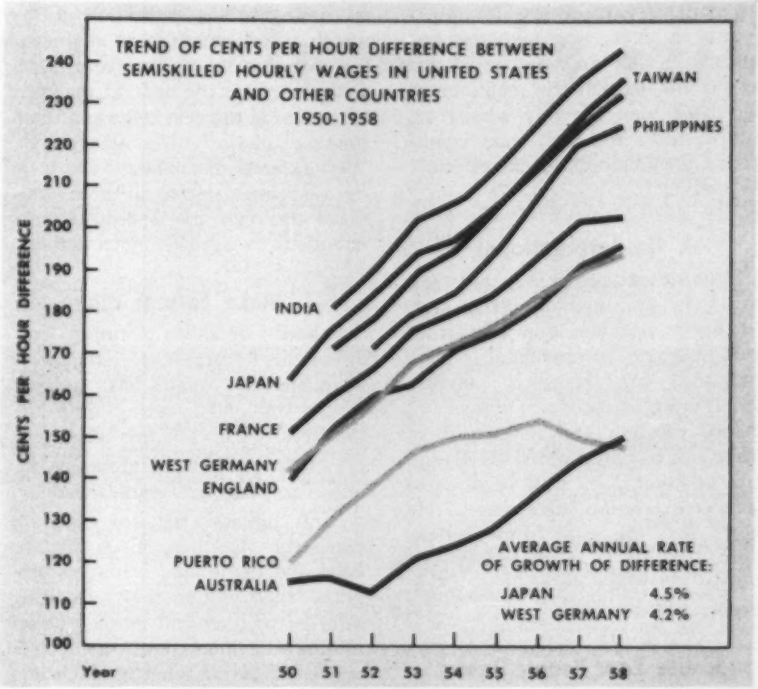
"Automation bodes greater influence, even than mechanization, because it adds self-correction to the mechanization process. The new computers are important in themselves . . . but their combination with other machines makes possible the self-correction in automation, and herein lies their tremendous value," says Mr. Haggerty.

3. Raise Reliability

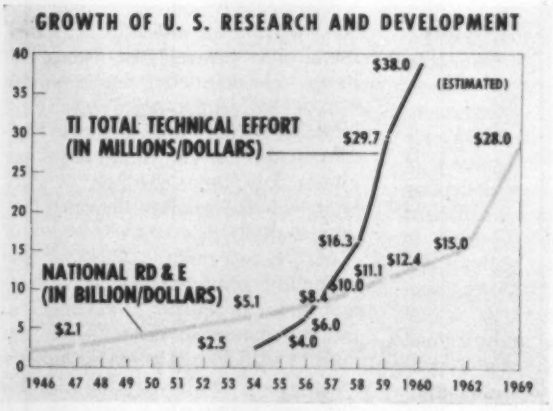
Quality and reliability represent a fundamental element of our ability to succeed technologically and indeed to compete in a technological world," Mr. Haggerty avers. Any time the complexity of a technical system doubles, the reliability of its parts must increase several times (see chart below). Mr. Haggerty notes the achievement of transistors with a reliability index of less than 1 failure in 100 million operating hours.

How to raise reliability? Listen to Mr. Haggerty: "In advance of a technological system or component accomplishment, there must be a knowledge of materials and environmental stress which must be endured. There must be good engineering design which permits parameters to conform in function and reliability. Characteristic modes of failure must be determined and eliminated. To achieve all that, there must be not only extremely capable personnel thoroughly educated in the theories and practicalities of quality and reliability, but there must be quality evaluation machines.

"To verify reliability indexes such as 1 failure per 100 million operating hours, it would be necessary to



Contrary to popular belief, the gap between wage rates paid workers in the U. S. and those paid abroad is widening. This chart gives some examples. Take Japan. The difference is about $2.30 today (vs. $1.65 in 1950)



U. S. outlays for research, development, and engineering have been climbing about 10 per cent annually and will total $12.4 billion this year, says the National Science Foundation. Note TI's growth rate

COMPLEXITY AND ITS QUALITY-RELIABILITY EFFECT

Assuming one failure per 263,000 transistor operating hours, the operating life, without repair, of various transistorized devices would be:

A 6-Transistor Radio	Five Years
A 20-Transistor Television Set	One and A Half Years
A 41,000-Transistor Computer	Seven Hours
A Comparable Vacuum Tube Computer	One Hour

Mr. Haggerty says product reliability has become fundamental to success. He shows in this chart, how the addition of parts affects reliability. He says better testing devices must be developed to aid in the quest for quality

test 230,000 transistors for 1000 hours (41 days) and to permit no failures in that time—to be 90 per cent confident that the requirement had been met. To rely wholly on human labor for such tasks would not be practical. Other means must be devised."

4. Go International

"We must recognize that the world is our market place and, whenever possible, our companies must become international organizations," Mr. Haggerty advises. "Marketing our products abroad . . . indeed creating and making them there . . . blending our skills abroad and at home . . . must be done to achieve maximum effectiveness." He notes that the sales from overseas operations of U. S. firms will be nearly 2.5 times as great as U. S. export sales by 1968.

5. Use Your People Power

"We must learn to use to the maximum extent the full ability of every single individual in every organization," Mr. Haggerty declares. He says management must look at an employee as a total individual and recognize his need for a climate in which he can have self-respect and be stimulated to apply all his capabilities.

6. Be Customer Oriented

TI has developed a management concept it calls "product-customer centering." It involves organizing around the individual rather than the function. It means orienting all employees to insure that the major emphasis is on recognition of the needs of customers and the creation and manufacture of products to satisfy those needs. TI considers research and engineering, manufacturing, and marketing of major importance and the line functions of its business. It looks upon such functions as control, finance, accounting, industrial engineering, and quality assurance as "performance maximizing" functions. Mr. Haggerty says people in those jobs must learn to identify themselves with the over-all business process (create, make, market) and the over-all business goal (profits, service to society), instead of the function.

He points out that "much of the success of an organization depends on timing in the utilization of research, development, and engineering information; in the recognition of the need for the new; in the consciousness of the customers and their product needs." Mr. Haggerty's "performance maximizers" are in a central relationship to all those functions and can make critical contributions to greater effectiveness.

7. Make Formal Plans

Formal, detailed planning and forecasting programs are essential to a system that relates management to the individual, rather than the function. TI does it this way:

1. It sets objectives, annually, for one, five, and ten years ahead.

2. It provides detailed plans to reach the objectives. Each division head and his middle managers program their activities — forecasting sales by product and market, determining facilities and manpower needed, deciding what research and development they'll do, and listing financial assistance needed.

3. TI integrates divisional plans into over-all company goals.

4. It sets up a week long planning session for each fall and one day meetings quarterly for all top and middle managers to discuss plans in detail and audit their performance.

Says Mr. Haggerty: "Formal planning forces key managers to plan, to compare their performance with the plan, and to keep informed on all company objectives. Each manager must succeed or fail and report performance to general management."

8. Keep Informed Technically

"It is essential that, as managers, we develop more profound knowledge in the technologies fundamental to our businesses," Mr. Haggerty declares. He says "the success of a company . . . likely will depend on the manager's having a sufficient technical grasp of the business to make proper judgments without undue dependence on technical specialists and committees. It is not enough to be professionally trained in management. There is a constantly increasing minimum of technical knowledge which the manager . . . must have."

For a free copy of this article, write: Editorial Service, STEEL, Penton Bldg., Cleveland 13, Ohio.

'Gold Rush' Hits Metalworking Men

MORE AND MORE U. S. exporters are quoting, invoicing, and accepting payment in currencies other than dollars. The practice isn't general, but "the trend is surely toward an increase of such procedure," says S. J. Rundt, consultant on international business.

U. S. shippers who are doing that are permitting their customers overseas to make the most of a discount dollar.

Mr. Rundt reports that most central banks of Europe are steadily shedding dollars in exchange for gold. The U. S. dollar has not only lost its premium, but it has drifted to a discount position.

• **How Much Gold We've Lost**—In 1958, we lost about $2.2 billion; last year, $1.078 billion. Since 1949, we've lost $6 billion. From July 1 to Oct. 19, 1960, $811 million has gone abroad. At the outset of 1960, we held gold reserves of $19.46 billion. That figure has declined to $18.58 billion. Only one year ago, $19 billion was unofficially mentioned as "the bottom not to be exceeded." Of the $18.58 billion on hand, about $11.8 billion represents mandatory gold coverage (by statute), while over-all foreign claims (most of them transferable into enforceable claims under existing rules) are now around $22.5 billion.

• **Devaluation Coming?**—"The dollar will not be officially devalued in the near future," Mr. Rundt believes. He points out that it would be politically impossible now. But he says a "fractional de facto devalorization" could come about at almost any time, through a widening of the trading margins by other nations.

Mr. Rundt adds: "Unless the oncoming administration is willing and able at an early moment to put our house in order (with regard to such things as taxes, budget, external payments, and the dip in our gold holdings) a real, official, dollar devaluation could become unavoidable by, say, 1962." ("Late 1961" is mentioned by some financial quarters abroad.)

Packaging: 70% Growth by 1970

BY 1970, industry will be spending 60 to 70 per cent more than it does now to package its products, predicts D. F. Morris, president, Mead Corp. About $18 billion is being spent now vs. $4 billion 20 years ago.

The company also thinks that most of today's packaging is unsatisfactory—things are either overpackaged or underpackaged. At a packaging symposium held at the opening of Mead's New Products Div., Cincinnati, he and other company officials urged industry to:

1. Take a closer look at new materials and combinations of materials available for packaging.

2. Develop a "systems approach" to packaging.

• **New Materials** — Packagers can get special properties by using paper as an inexpensive base material in combination with other materials. Examples:

Polyethylene coated boards — Fiberboard containers coated with polyethylene and laminated with waterproof adhesives can stand up to moisture vapor, water and many other liquids. Liquids can also be stored when the board is heat sealed into a container shape.

Nonabrasive coatings—Plastic and wax are being applied to the inside of paperboard boxes and packing to eliminate scratching, marring, and discoloration of product finishes.

Barrier coatings — Materials that resist the transmission of oils, moisture vapor, oxygen and other gases improve storage life of the product or permit the sale of products that couldn't be brought to the market without special packaging materials. Barrier coatings include combinations with paperboard such as aluminum foil, Saran; polyethylene, and glass lined paper.

"In paperboard, we can expect to see the increased use of plasticlike papers. They will exhibit many of the properties of pure plastics and yet will have a paper base. This will permit the development of new shapes embodying low cost and high functional performance," say Mead officials.

Some of the company's experimental products include paper compositions that can be formed under heat and pressure to retain complex, drawn shapes. Another development: Thin plastic films over paper.

Predictions for paperboard include: Production at faster machine speeds, stronger and stiffer containers with smoother and more attractive finishes—particularly those finishes that now must be laminated on foils, glossy paper, and films. Ultimately, they will be produced as an integral part of the paper.

In the can market, Mead expects many applications for foil or plastic treated paperboard in sidewalls.

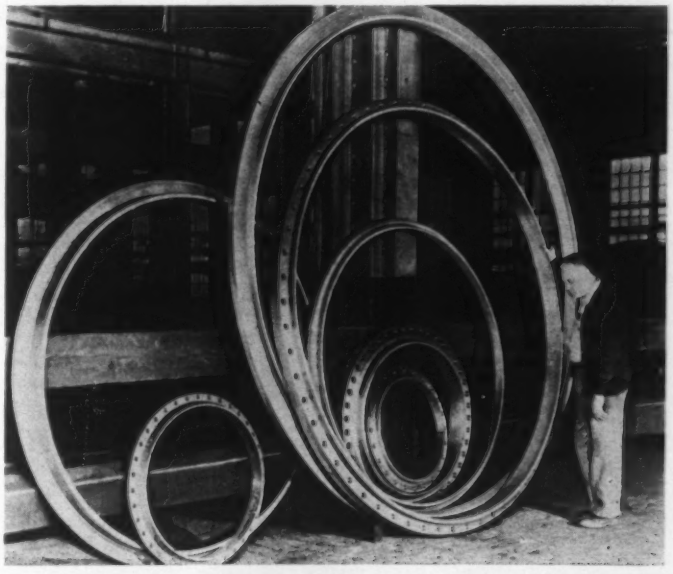
• **Systems Approach** — Two facets are involved: Manufacturing and distribution. Manufacturing includes container design, assembly, filling, capping or closing, marking or labeling, and palletizing. Distribution covers transportation, loading and unloading, warehouse handling, package merchandising, and using the container to help sell the product.

An increasingly important factor: The use of automatic equipment to help cut packaging costs. Mead officials cited this example:

Packing costs were reduced by 50 per cent when automatic techniques were worked out for a nailmaker. In addition, filling is faster, and the nails are packed tighter.

The key to the setup is a paperboard carton folded from a single corrugated blank. It's designed with a spout that can be refolded tight each time it's used.

Weighing and packing are handled by a magnetic unit (made by Dake Corp., Grand Haven, Mich.). The unit takes 50 lb of nails, drops them down a chute, and uses an electromagnet to align them horizontally before they drop into the package. Formerly, a vibrator took 13 minutes to shake out the tangle, so the nails could fit into the box.



FLANGES, supplied by Tube Turns Div., Chemetron Corp., Louisville, are used to close ends or join sections of industrial vessels subjected to internal pressures up to several hundred psi. The largest one shown weighs more than 2½ tons and is 11 ft in diameter. The smallest weighs a modest 240 lb and has a 26 in. bore

Depreciation Headed for Round 2

DEPRECIATION will be a top issue when Congress convenes in January. David A. Lindsay, general counsel, Treasury Department, understated the reason last week: ". . . There have been many suggestions in the last two or three years for further revision and liberalization of depreciation allowances."

Regardless of how the Presidential election turns out, the next administration will be concerned with how depreciation reform will affect incoming revenue.

The Treasury and President Eisenhower tried to get a measure through the last Congress which would treat income from the sale of depreciable property as ordinary income. President Eisenhower is expected to make the same request in his budget message in January.

● ARGUMENTS AGAINST LIBERALIZATION— Mr. Lindsay notes that many industrial nations with which we compete have more liberal depreciation practices than ours, but he argues: "Depreciation (is) merely a matter of timing." In most industrial nations, he says, a "balancing charge" is made on the sale of depreciable property "which recoups in ordinary income the amount of the depreciation taken." He sums up: "Before depreciation rules can be substantially liberalized administratively, permitting more flexibility of choice on the part of the taxpayer, we believe Section 1231 should be amended as proposed in the President's budget message." This would, among other things, permit "taxpayers to select a zero salvage value and thus eliminate a problem that has been a headache to both the Internal Revenue Service and to taxpayers."

Mr. Lindsay reports Treasury's survey of depreciation practices in industry will be ready "early next year." If it is not ready in time for President Eisenhower, it's a safe bet that the next administration—Republican or Democratic—will not just drop the survey. The study was pushed by both parties as necessary before any reforms could be made.

Earlier this year, industry tax experts charged they were being asked to buy a pig in a poke on the administration's recommendation regarding the sale of depreciable assets without knowing what other changes might be made.

● SURVEY REPLIES STILL NEEDED — Action of any sort depends upon industry's replies to the depreciation survey. Treasury is concerned because some important companies have not replied to the questionnaire. About three-fourths of the companies included on the "must reply" list of 2700 have responded. The rest have asked for more time or appear to be uninterested. Treasury is prodding those firms for their responses as soon as possible. If Treasury tabulates its findings with some of the 2700 top companies not included, officials fear their work will be open to charges of being nonrepresentative or incomplete.

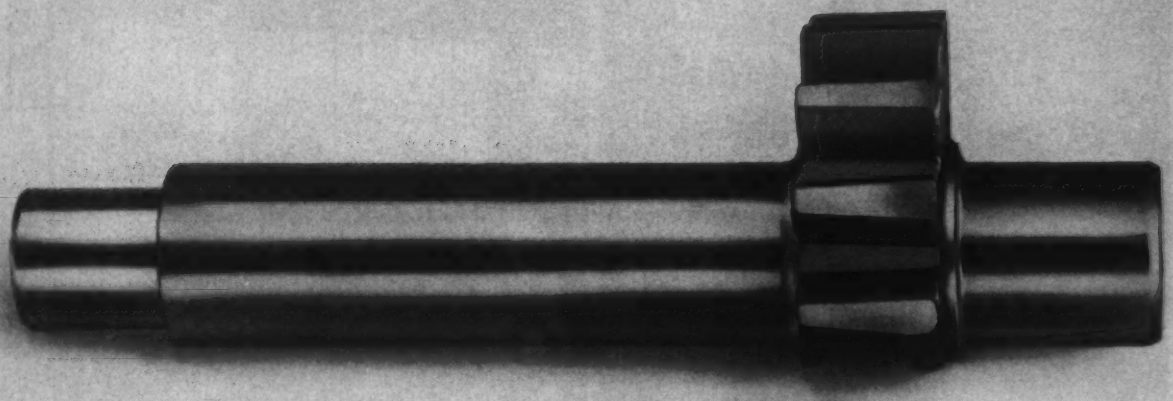
The grapevine has it that some firms are still debating whether to participate. Among the 6000 small firms polled through the Small Business Administration, about 2000 have replied. Treasury is making no effort to get more replies among that group because the sample is thought to be a good one.

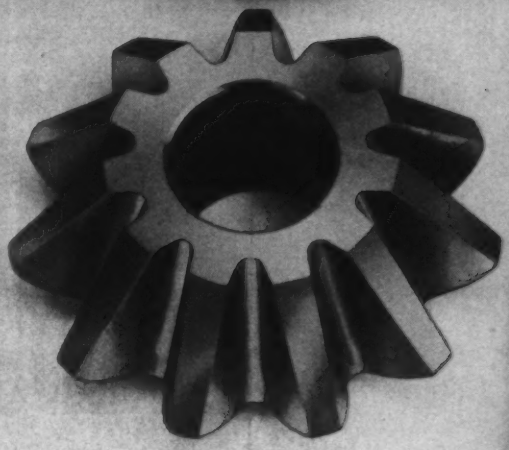
● SURVEY MAY HAVE SOME SURPRISES—Fred C. Scribner Jr., Treasury undersecretary, suggests that some tax experts who have been pumping for depreciation reform may not like all the survey results. "The early returns show a great variety of depreciation practices and a wide variety of opinions about what should be done," he says. He points out that many respondents do not think capital investment decisions will be spurred by faster depreciation methods. Technology and business needs determine the need for equipment, say most. The majority generally is willing to confirm book depreciation with tax depreciation as a condition of liberalization and is willing "to forego capital gain treatment as a condition" for liberalization.

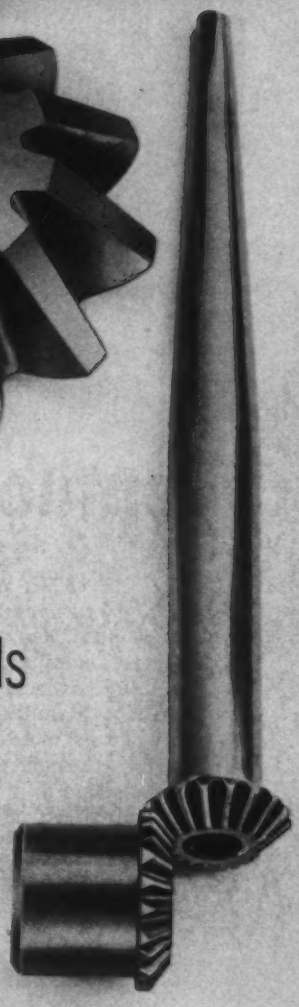
When the survey results are tabulated, Treasury will consult with the several committees on Capitol Hill interested in depreciation. Then, depending upon the attitude of the White House, a formal recommendation will be made to Congress.

Both candidates for the Presidency appear to recognize the need for some depreciation changes, but both will be careful about proposing anything which can be described as a giveaway. It is noteworthy that the AFL-CIO has sent a 118 page study of federal tax laws to both men and made 20 recommendations for revisions. Among the revisions: Repeal of "liberal" depreciation methods added to the code in 1954.

● CAPITOL NOTES . . . The Air Force won its battle for the B-70. Another $55 million has been added to the fiscal 1961 program. All told, $265 million will be spent this fiscal year, probably $400 million in fiscal 1962. The first prototype will fly in 1962 . . . The House will look into the Nike-Zeus antimissile program next year. The administration has not obligated $137 million appropriated by Congress for the Army missile.







THE Gleason Revacycle® method and its machine present the fastest way known for cutting precise straight bevel gears.

The Revacycle cutter holds roughing, semifinishing, and finishing blades. One revolution of the cutter completes a tooth space in 2.5 seconds. In fact, on smaller pieces, you can complete as many as four tooth spaces with a single cycle . . . that's less than ½ second per tooth!

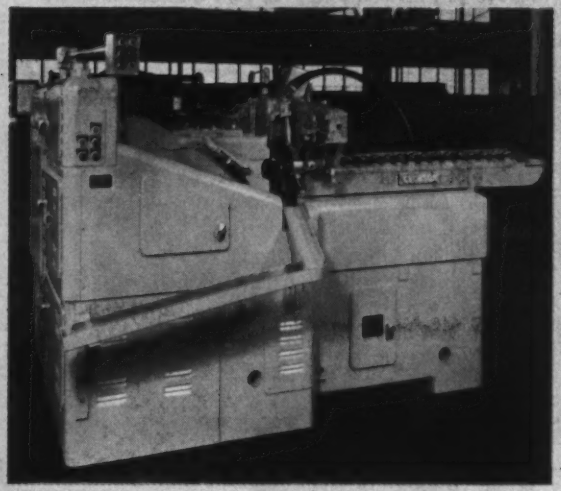
This completely automatic Gleason machine can frequently replace a tandem of roughing and finishing machines . . . thereby saving considerably on capital investment.

Best of all, to get this speed and economy you need sacrifice nothing in accuracy. The Revacycle method produces localized tooth bearing which permits any practical assembly tolerances while avoiding load concentration at the ends of the teeth. And, you get exact reproduction piece after piece, day after day.

The machine accepts a wide range of work: diameters up to 10" at a 5 to 1 ratio and face widths up to 1.25".

For complete background and data, write for a bulletin. Gleason engineers will help you with details on any specific applications.

How to cut a bevel gear tooth in 2.5 seconds



1.2 SECONDS is all it takes to dechuck a finished piece and chuck in a new blank with the automatic loading attachment on the 109 Revacycle Machine.

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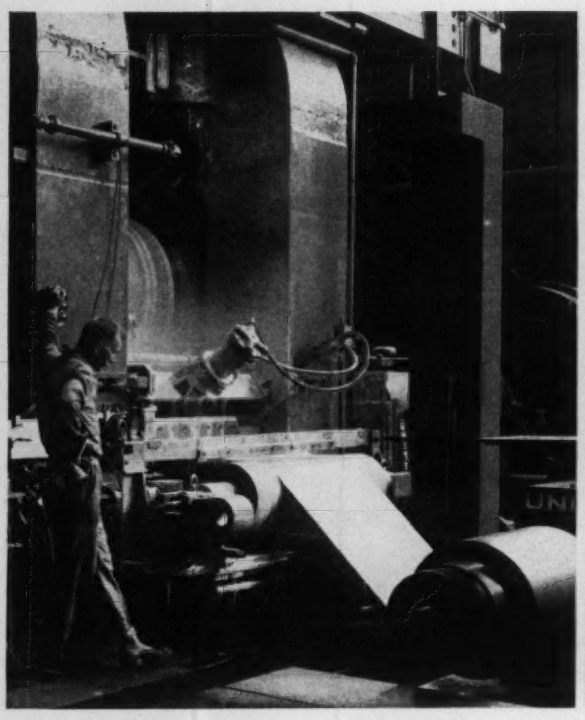

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KENTUCKY offers the metalworking industry many unusual advantages. That's why fabricated metal and machinery make up Kentucky's biggest industry . . . why employment in this industry has increased 64% in the past ten years. In fact, Kentucky's 42,000 metalworking jobs account for more than one-fourth of all manufacturing employment in the State. And in 1958, value added to products by 295 Kentucky metals and machinery manufacturers totaled more than $490,000,000.

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COMMONWEALTH OF
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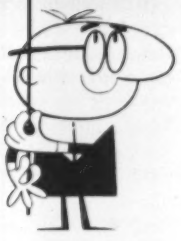
WHERE BIG THINGS ARE HAPPENING

MATERIALS EFFICIENCY

How to Slash Scrap Costs



ONE TON of material out of every five you buy is scrapped.

That's metalworking's average and a reason why materials account for half of total industry costs. The best creative buying and management can be nullified because scrap is neglected.

When scrap is minimized, what's left is an asset, not a nuisance, experts advise. "Scrap is a valuable byproduct," says Robert H. Clymer of Clymer Associates Inc., a consulting firm in Reading, Pa. "Each industrial plant that makes a lot of scrap should have a man of executive caliber in charge of it. He'll more than pay his way."

If you don't generate enough scrap for a full salvage department, make it a part time assignment. The purchasing agent is the usual candidate. "Purchasing has some knowledge of the business channels for returning the materials to productive use because it acted to obtain them originally," says Henry Van Noy, director of administration, Tasker Instruments Corp., Hollywood, Calif.

"We consider scrap disposal one of the materials management problems," says Frank J. DeCrane, director of purchases for Lamson & Sessions Co., Cleveland. "Here, purchasing handles scrap sales."

Sometimes the plant manager or even the sales department handles the problem. Under any setup, it should be tackled from four angles:

1. Reduce the percentage of scrap generated.
2. Convert as much of the remaining scrap as possible to raw material for other uses.
3. Upgrade the quality of the scrap that can't be converted to get the highest possible price for it.
4. Improve in-plant handling.

Reduce Scrap

You can cut scrap losses many ways, but these stand out:

1. Redesign the part.
2. Make it by a different method.
3. Reduce the number of bad parts.

• **Redesign** — Aluminum Co. of America shifted its design from a

hand forging to a blocker-type design then to a precision forging. Machining losses slid from 1170 lb in design Stage 1 to 415 lb in Stage 2 to 60 lb in Stage 3.

• **Make It Differently** — A gastight corner for the Convair 880 jetliner was forged conventionally from an aluminum alloy. Convair Div., Ft. Worth, Tex., General Dynamics Corp., switched to explosive forming with a high energy press. In forging, it started with a 4 lb 10 ounce piece of metal and ended with a 10 ounce part. In high energy forming, it started with a 12 ounce billet and ended with the 10 ounce part. Weight loss was 32 times greater with the first method.

• **Reduce Bad Parts**—General Electric Co.'s Light Military Electronics Dept., Utica, N. Y., had excess scrap caused by ragged ends and wrong lengths in a cutoff operation for Teflon tubing. Its solution: A cutoff machine that is programed by an aluminum disc which has five concentric circles formed by perforations. The perforations determine lengths the sleeving can be cut. Scrap from bad parts has been virtually eliminated. Savings on scrap and increased production total $17,500 a year.

The first two approaches usually aim at minimizing machining losses. Buying metal nearest in form and size to your end product will also help. Nearly every aircraft and missile maker tells STEEL that rough machining must be replaced by precision forming. The industry wants forgings, extrusions, and castings that are "born to shape." All industry pays a heavy penalty in the form of waste chips. Claims one production supervisor: "Because machining costs us so much in scrap and extra labor, we can afford to pay dearly for any redesign or process that will eliminate much of it."

The redesign or new process approaches often lead to fewer rejects. All three routes frequently intersect.

Convert Scrap

What's scrap one place may be raw material elsewhere. And a raw material almost always brings a higher price than scrap. Reclamation saves Martin Co. $200,000 a year at Denver. Sometimes, the conversion doesn't require the slightest change in the physical form of the scrap, just a change in viewpoint. Example:

An Inland Steel Co. salesman, Jack Hammond, visited the plant of an appliance manufacturer and watched a 12 in. diameter hole being blanked from steel. The discs were being sold as scrap. A few days later, he was in another customer's plant (a metal specialty fabricator) where he saw a cup being drawn from steel circles. After checking specifications, he found that the scrapped blanks of customer "A" would work for customer "B." The appliance firm now gets a higher price for what was once scrap. The metal fabricator has a steady source for steel circles at a price that cuts his production costs more than $6000 annually.

Sometimes, you have to go a little farther than Inland Steel's salesman to turn scrap into raw material. The steel industry sells everything from the pig but the squeal:

• A material of a sugarlike appearance that comes from pickling vats is sold as ferrous sulfate.

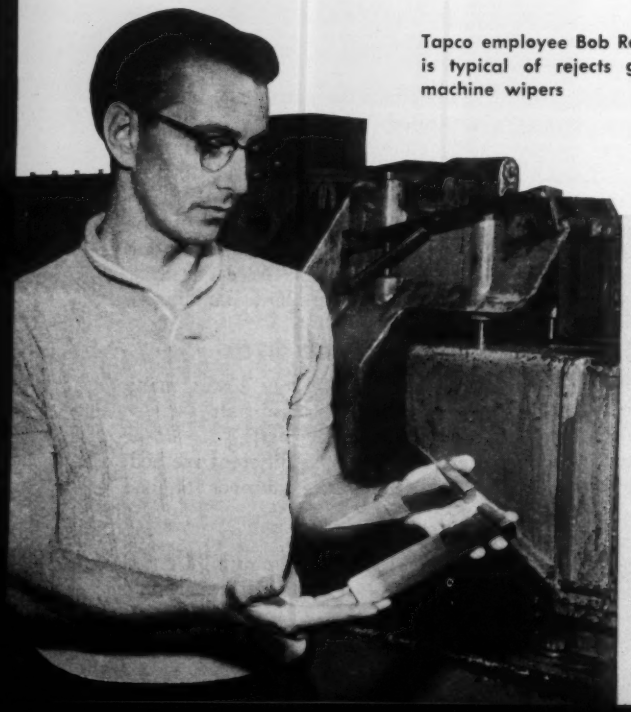
• Nailmaking plants package and sell "floor sweepings" as mixed nails.

• Mill scale sold to International Business Machines Inc. is used to coat cards—the metal gives them magnetic qualities. Scale also goes into magnetic ink.

• Cuttings from stone used to line soaking pits go into walls and decorative garden applications.

Bethlehem Steel Co. is using decanter sludge to improve the flame qualities of open hearth fuel. Coke breeze was once a problem because of its smallness. Now Bethlehem cites its use in sintering, as

(*Please turn to Page* 84)



Tapco employee Bob Rothermel shows two jet blades. Top blade is typical of rejects generated before he suggested reversing machine wipers

Generate Less Scrap

An 82 per cent reduction in the scrap allowance. Production men achieved that saving in a horizontal broaching operation at the Tapco Jet Div., Thompson Ramo Wooldridge Inc., Cleveland.

The job: Broaching titanium rotor blades for the J-57 jet engine. As the fixtures moved through the machine, wipers helped locate the parts—then a locking cam clamped the parts in the fixtures. Incorrectly held parts entered the machining stations with no further check. Result: They were improperly broached and had to be scrapped.

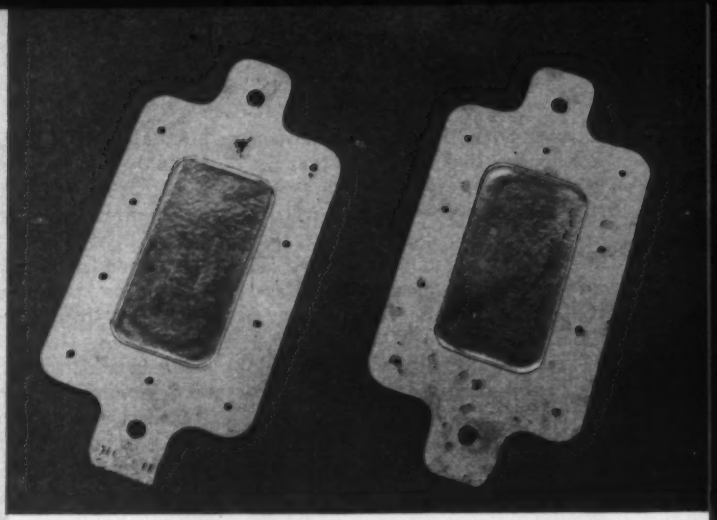
Production men reversed the wipers so they check the parts after the fixture clamping is complete. Now, when a blade isn't fixtured properly, wipers stop the machine.

Convert Scrap for Other Jobs

More than 600 titanium parts produced. Tailored sheet remnants at North American Aviation Inc., Los Angeles, were converted for re-use.

The problem: North American production men generally use remnants from stamped sheets, but they ran into a special problem with some scrap titanium stock 0.071 in. thick. There was no demand for that gage. Stock 0.063 and 0.050 in. thick was in considerable demand.

The solution: Remnants of the thicker stock were collected and put through the company's chemical milling operation—etching the material to the two, more popular gages. More than 600 lb of the material were utilized in a three month period.



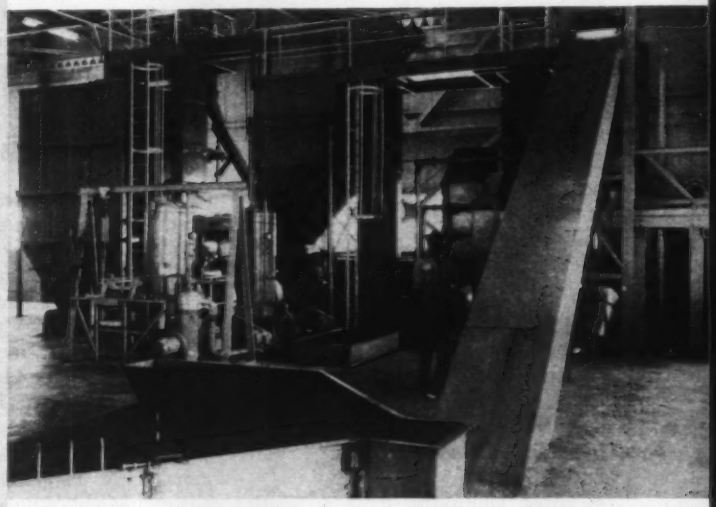
These small titanium stampings are typical of those North American chemically milled to usable gages

Upgrade Scrap Quality

$10 extra per ton. That's the average premium being paid to Link-Belt Co.'s Indianapolis bearing plant for metal chips that come from two lines of automatic screw machines.

The dividend is paid because the chips, unlike the turnings that come off the machines, have been crushed to a uniform size, and the cutting oil has been removed. Crushing and cleaning are done in a Link-Belt, continuous, metal chip handling and cutting oil recovery system (at right). As much as 95 per cent of the cutting oil is sterilized for re-use. Savings can run as high as $47 an hour.

A similar installation in another plant will pay for itself in three years via scrap premiums and oil savings.



Chips are crushed, spun dry, and the cutting oil is reclaimed in this processing line

Improve In-Plant Handling

Calculated savings of more than $5000 a year. A few simple changes in scrap handling at Warner & Swasey Co., Cleveland, have eliminated one operation and reduced the amount of transporting necessary to get machining chips to storage areas.

Chips used to be raked from the machine tools by sweepers, then pushed to an antiquated crusher that ran 4 hours a day, preparing the chips for the scrap dealer. Crushed chips were hand dumped into storage bins. The haul to the crusher from a plant across the street was a particularly long one.

Motivated primarily by a need to replace or eliminate the crusher, W&S managers consulted scrap dealers for better handling techniques. The crusher (which was operated 4 hours a day) is gone. Chips are dumped by sweepers into self-dumping hoppers situated throughout the plant. Lift truck drivers pick up the hoppers, take them to one of two storage areas (eliminating trucking from one plant to another) and automatically dump the chips.

Trucker dumps one of the self-dumping hoppers into a portable storage bin that will be picked up by the scrap dealer

a steam boiler fuel, and to form a soft floor in soaking pits so that the ingots, having uneven bottoms, will stand vertically.

Blast furnace dust was once lost in gas. Now much of it is removed in a settling chamber, sintered, and recharged into the blast furnaces, reports Bethlehem.

The steel industry has made some of its most dramatic recoupments from blast furnace slag. Mountainous piles once disfigured many acres near steel plants. They're disappearing today because profitable uses have been found for the material in cement manufacturing, as railroad and highway ballast, as a building and insulating material in a foam or expanded form, and as a fertilizer.

Steelmen even get byproducts from the byproducts, says Bethlehem. Coke oven gas has long been recovered during the coking process. Now, unwanted hydrogen sulfide is generally removed from it before it's used in the open hearth. It can be converted into commercially valuable sulfuric acid.

Upgrade Scrap Quality

You'll always have some scrap that can't be converted to raw material. You'll get more for it if you keep it segregated. Here's why, as figured by Marquardt Corp., Van Nuys, Calif.:

- Mixed aluminum scrap is worth less than three-fourths of that separated and placed in marked containers.
- If steel scrap is mixed with aluminum scrap, the value of the aluminum portion drops 60 per cent.
- Mixed stainless steel is worth about 80 per cent less than if it is separated and placed in marked containers.
- Re-usable aluminum (in small squares or rectangular sheets) is worth twice as much as clean segregated scrap.
- Re-usable stainless is worth four times as much as plain segregated scrap.
- Mixing aluminum and magnesium turnings and borings makes both metals worthless.

Improvement of scrap quality is getting more attention. The Institute of Scrap Iron & Steel Inc. and the American Iron & Steel Institute are co-sponsoring a research program at Battelle Memorial Institute, Columbus, Ohio. Its aim: To find a method of controlling scrap quality. Battelle wants to purge tramp metals that lower the quality of steel made from scrap and to find a reliable way of determining the content of scrap bundles.

Allegheny Ludlum Steel Corp. once bought a truckload of 18-8 scrap solids. Examination revealed it consisted of 18-8 pen points with gold tips. The gold contaminated the scrap.

Segregate scrap where it's produced. Equipment can be as simple as a tote box at the point of generation to an elaborate conveyor system that carries scrap from where it's made to the railroad car. Marking systems are a help. So is a knowledge of the many scrap grades. The Scrap Institute yearbook can give that information.

Make Handling More Efficient

The least, simplest handling is best. But the basic tote box system won't do if you make lots of scrap. Fortunately, the more elaborate systems can also separate scrap and bring you a better price. As a result, a system set up by Miehle Co., division of Miehle-Goss-Dexter Inc., Chicago, will pay for itself in a year. It consists of a hopper over a vibratory feeder and a permanent, nonelectric, magnetic, agitator-type drum. Miehle's unsegregated scrap contains both magnetic and nonmagnetic metal. The magnetic action of the drum snaps the ferrous material to it, and its revolving cylinder carries it to a discharge chute. The nonmagnetic material falls from the tray of the feeder into another chute. Contrary to the general rule, Miehle finds it cheaper to separate the scrap later than at the source.

Western Electric Co. wrestled with 50 tons of scrap a day at its Indianapolis plant. It solved the problem with self-dumping hoppers and radio-equipped platform trucks to carry the material away.

Sometimes a scrap dealer can solve your handling problems with his own equipment. One did for Carrier Corp. The dealer has $18,500 worth of containers, a tractor, and a carrier at the company's Syracuse, N. Y., plant.

Scrap processing can be part of the handling problem. But don't try to do more than you can economically justify.

It's usually better to let the scrap dealer do that part of the job because, generally, he can do it more cheaply.

Only larger factories generate enough of the material to make operation of a bailing press or shear pay off.

Scrap Has Value

One problem is the material's constantly changing worth, as attested by STEEL's iron and steel scrap index (Page 162). If you generate little scrap, you'll probably be wise to hold it for favorable prices. But if you generate a lot and need to get rid of it regularly, you'll find it best to have a contractual arrangement with a local dealer to take it periodically.

Aside from price, timing is important for maximum return on your reclamation program for another reason. What's worthless today may be valuable tomorrow because of technical developments. Slag's increasing importance to the steel industry is a case in point.

So, check your reclamation program frequently—for efficiency, for pricing, for technological change, or for plain oversight.

Scavengers paid New York City $33,000 in 1959 for the license to pick over industrial waste piles at city dumps.

Materials Efficiency

Make Your Buyer a Pro

That's the article coming up Nov. 21 in STEEL's 1960 Management series. For a free copy of any or all articles in this 13 part program on materials efficiency (which started July 4 and will run every other week for the rest of the year), write Editorial Service, STEEL, Penton Bldg., Cleveland 13, Ohio. Also available on the same basis is the companion series on production efficiency which appeared during the first half. Use of material like this may win you $1000. For details, see Pages 5 and 6.

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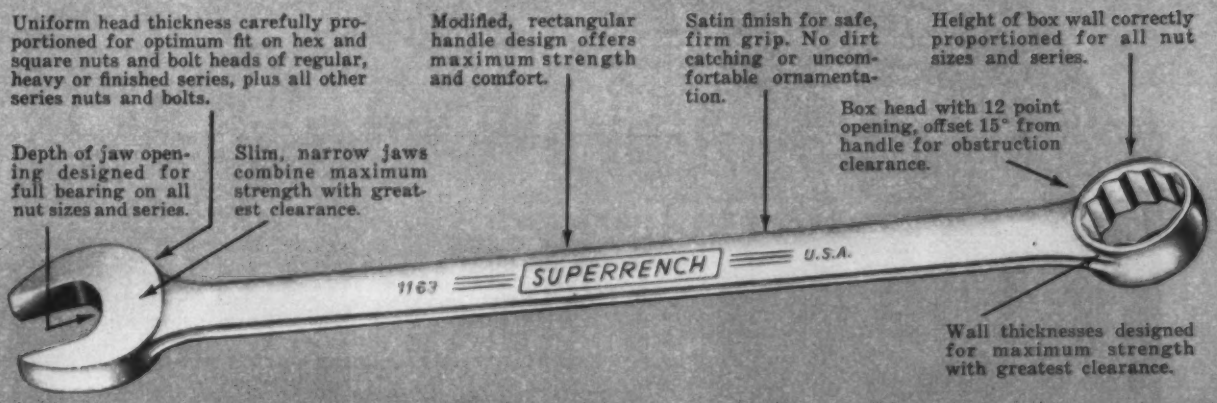
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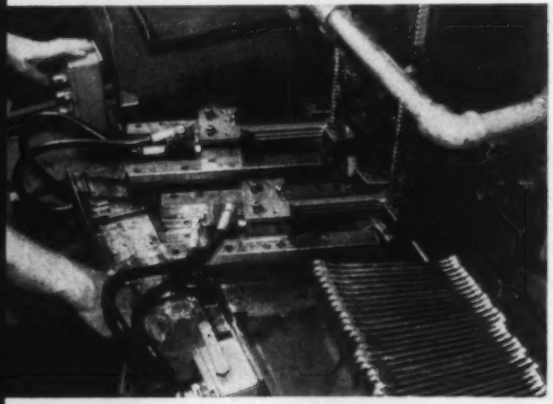
This three station transfer machine drills, broaches and chamfers box openings to close Williams' tolerances.



Open-end heads are broached to extremely close tolerances on this two station vertical ram machine.

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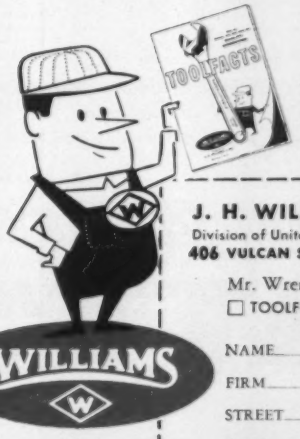

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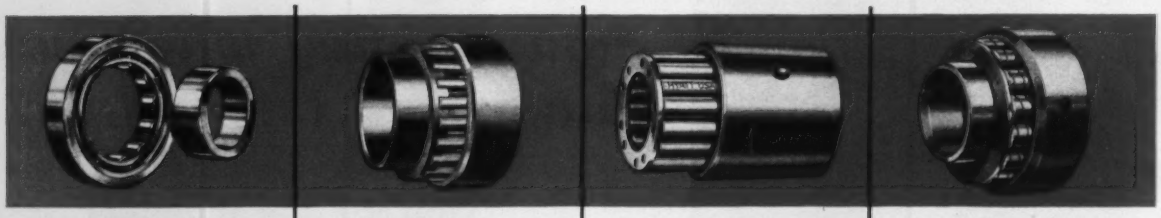

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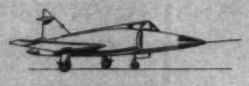

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GM Bids for World Market Stature

Chairman Frederick G. Donner (right) and other officials stressed that last week at GM's Motorama in New York. The world's largest automakers still believe 7 million cars can be sold domestically next year. By 1970, they expect Free World passenger car and truck demand to hit 20 million units. Backing up their faith in the market, officials report $1.25 billion will be spent for plant and equipment next year—$50 million more than in 1960.

GENERAL MOTORS CORP. still believes auto sales (including imports) can reach 7 million units in 1961 if consumer income continues to rise and consumer confidence is sustained. GM will spend $1.25 billion on plant and equipment next year to back up its faith in the market. That's $50 million more than it committed this year.

Much of the expansion will be in GM's overseas facilities as it faces a rapidly growing world market. Despite some industry and customer criticism, John Gordon, GM's president, confirms that the company will continue to make annual model changes as it moves into a marketing era which will see worldwide demand for passenger cars and trucks reach 20 million units annually by 1970. Frederick G. Donner, chairman, predicts a 40 per cent growth in the number of passenger car registrations by 1970.

• **Mills Disagree**—Many areas of the metalworking business are not ready to agree with GM's optimistic forecasts. Steel producers, whose ingot production rate was 51.7 per cent of capacity last week, are more pessimistic. Market analysts for one mill predict next year's car production will run 5.5 million to 5.7 million units. They believe calendar retail sales will reach 5.7 million to 6 million units. The same analysts think 1962 output will reach 6.5 million if the economy pulls out of the 1958 type decline they say it's entering now.

Regardless of which way the buildup goes, don't look for a sizable flood of automotive steel orders before the first of the year. Industry stockpiles (including steel in process) average out at the three month level, claim mill sources. Based on current projections (fourth quarter car output of 1.4 million to 1.5 million units), Detroit has enough steel to keep going into 1961's first quarter. If mill forecasts are correct, carbuilders won't be placing sizable orders until next February or March. Mills report they are already seeing a slowdown in November orders. Of course, if Mr. Donner's hopes pan out, motordom will be booking heavier tonnages in December.

• **Less Steel**—Average per car use of steel will drop in 1961 as compact sales rise. Mills expect to ship 1.65 tons of steel for each 1961 automobile. That compares with 1.75 tons for 1960 cars and 1.82 tons per car in 1959. Minimum passenger car consumption will be 9 million tons of steel. If the industry builds 6.4 million cars, shipments to auto plants will be better than 10.5 million tons.

Automobile shipping weights are

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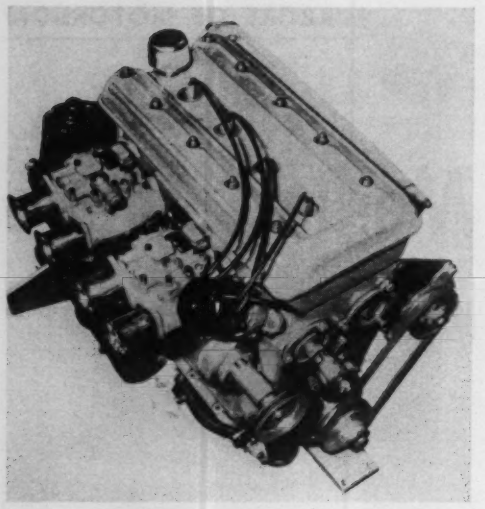
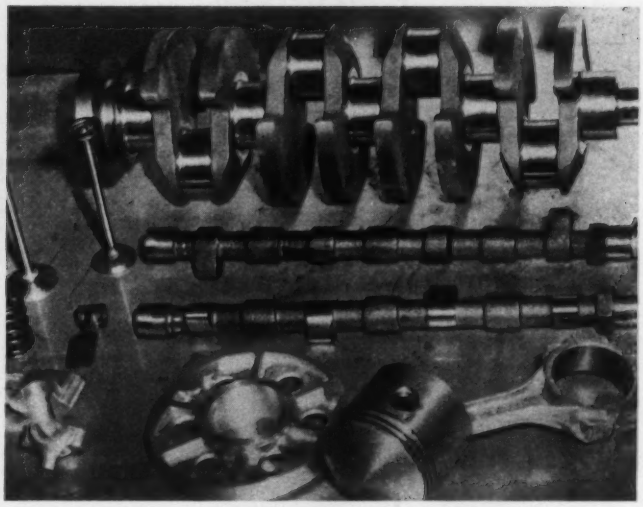




NEW, FOUR CYLINDER ENGINE (left) turns out 1 hp per pound. It will be in production by the first of the year at Tyce Engineering Co., Chula Vista, Calif. Key features include a hollow crankshaft and double overhead cam (right) and a cylinder block of welded and brazed, thin, stainless sheets. The block design eliminates the head gasket

down too. The average was 3650 lb in 1959. It declined to 3400 lb this year. Next year, mill men estimate the average will be 3200 lb. Several marketers believe compact cars will account for 45 per cent of the industry's 1961 production—vs. just under 30 per cent this year. Mr. Donner says that as recently as three years ago, standard sized cars still accounted for 95 per cent of the market.

U. S. Auto Output

Passenger Only

	1960	1959
January	688,731	545,756
February	659,323	478,518
March	654,242	576,080
April	582,909	578,846
May	611,226	546,817
June	613,147	557,995
July	434,377	555,410
August	305,527	239,152
September	407,685	258,151
October	615,000†	507,527
10 Mo. Totals	5,572,167	4,844,252
November		254,527
December		494,931
Total		5,593,707

Week Ended	1960	1959
Oct. 1	134,118	105,720
Oct. 8	140,832	118,793
Oct. 15	144,056	133,430
Oct. 22	146,339	112,488
Oct. 29	149,525†	101,616
Nov. 5	145,000*	66,451

Source: *Ward's Automotive Reports.*
†Preliminary. *Estimated by STEEL.

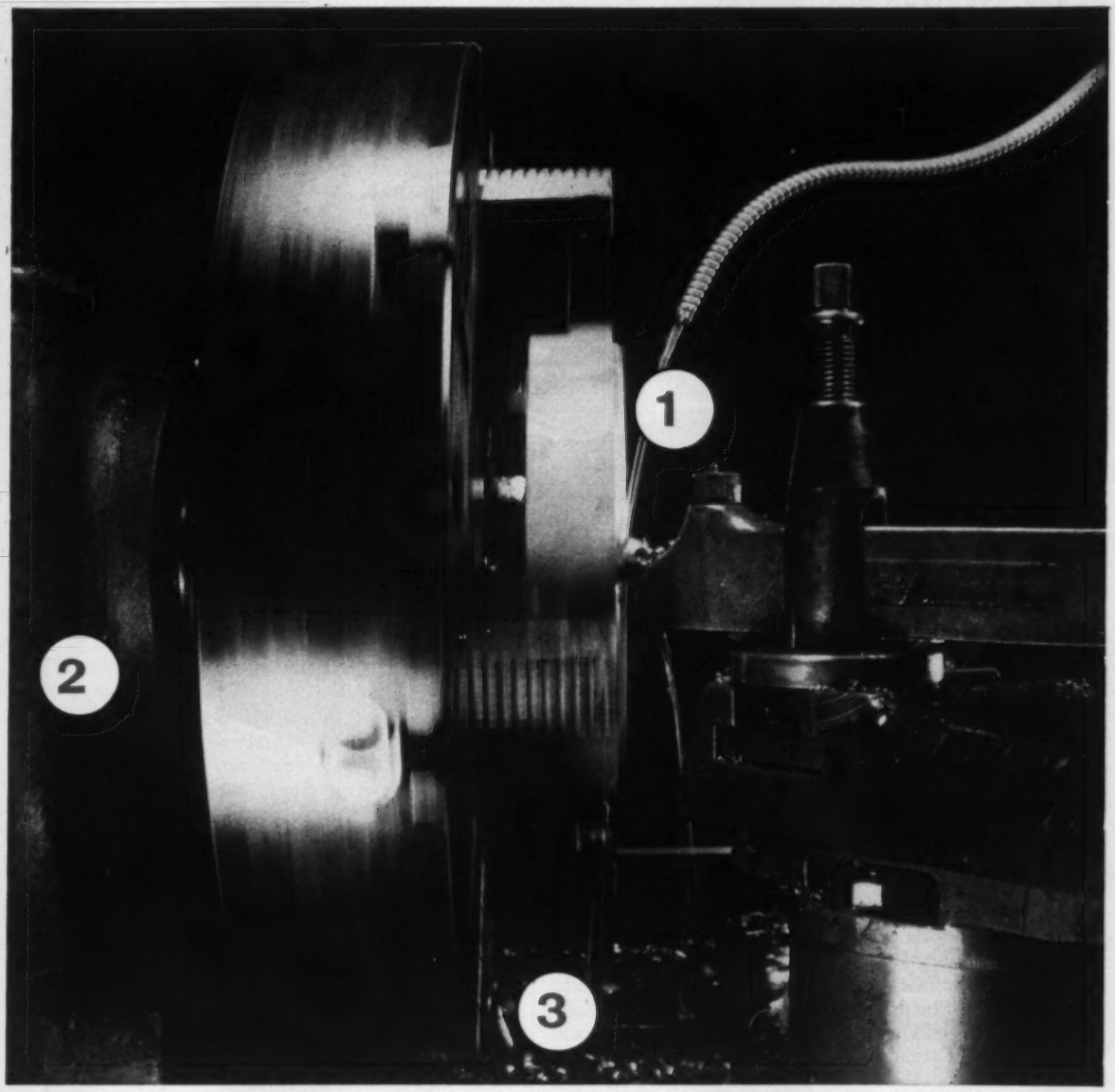
• **Long Look**—Discussing the long term outlook, Messrs. Gordon and Donner make it clear that GM considers that it is competing in the world market, not just the domestic. Since 1949, the company has increased its overseas assets $1 billion. Its total worth in foreign countries is now $1.35 billion. In the next two years, GM expects to spend another $500 million for plant, equipment, and tooling in 19 overseas countries. Says Mr. Donner ". . . almost 90 per cent of the vehicles we sell overseas are produced in our manufacturing plants abroad . . . by 1970, we can anticipate a total demand for passenger cars in the Free World in the neighborhood of 16 million units. Demand for trucks will reach nearly 4 million units." About half will be marketed in the U. S.

• **Changes Continue**—GM's marketing strategy was reaffirmed last week at its New York Motorama. The company made clear it will not abandon annual model changes. That's a touchy point in the industry as buyers continue to press for more economy in operation and initial price. "Neither our industry nor any other industry need apologize for dynamic obsolescence. If manufacturers did not change models each year, the 20 million new car buyers who come to market over a period of three years might come only once in six years. This would cut our annual sales in half, and the reduced volume would mean higher unit costs," explains Mr. Gordon.

He says that a few cars can get by without annual changes only because they account for only a limited share of each year's sales. "If we had nothing new to offer our repeat buyers, they'd come back less frequently. Even a reduced price would not tempt them," he believes. Citing an example of the benefits of regular changes, Mr. Gordon reports: "In the last five years, our engineers have . . . improved the design and construction of brake drums . . . the temperature generated when you apply your brakes has been reduced as much as 200° F."

Imports Share Is Down

Import sales are continuing to drop. Latest registrations (August) show imports are running 21 per cent behind last year's pace. They're expected to take less than 8 per cent of 1960 industry sales compared with 10.1 per cent last year.



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AMERICAN ORIGINALS IN IRON AND STEEL

Samuel Higley—America's First Steel Maker

The credit for producing the first steel in America goes to Samuel Higley of Simsburg, Connecticut. In the Connecticut State Library there is a certificate signed by two blacksmiths . . . Phelps and Drake, stating that Higley took specially shaped wrought iron from them and later returned with the iron refined into steel.

This certificate is dated May 7, 1728, but it has been established that Higley's first experiments bore fruit in or around 1725. Based on the testimony on this certificate Higley and his associate Dewey were awarded patent rights to run for ten years.

It is believed Higley made his steel by the cementation process. In this process, charcoal was packed around wrought iron bars and the whole mass was heated in a closed furnace for a week or more. The longer the iron was heated, the more carbon it absorbed from the charcoal. This "blister-steel," or rather, an iron core with a steel surface, was poor in quality by modern standards, but it was the beginning of one of America's greatest industries.

Years ago, as a result of continuous experimentation, The J. E. Baker Company developed Baker's Magdolite, the original dead-burned dolomite. Today, Baker's Magdolite delivers more uniform ingots with less defective production material. It is always 5 ways better, in composition, preparation, strength, economy and quality.

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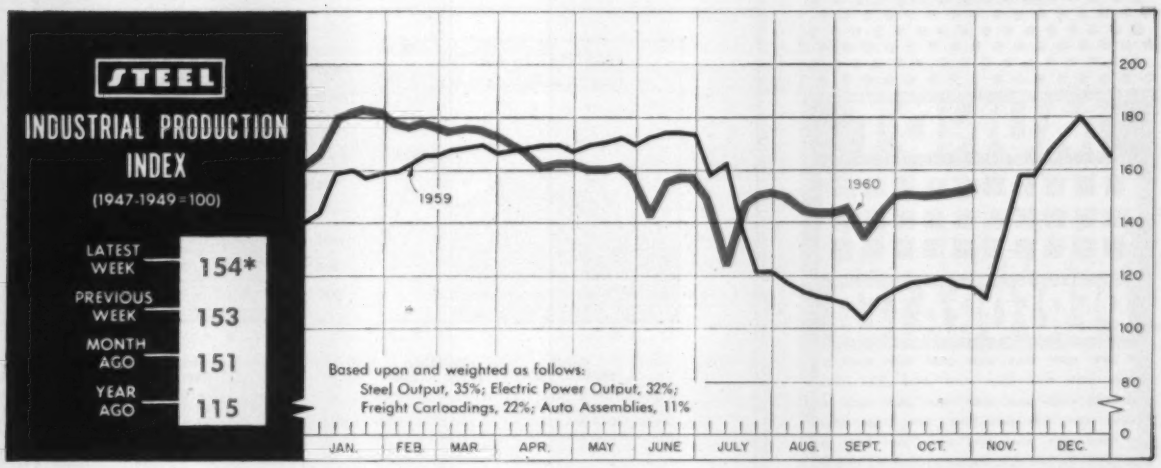

*Week ended Oct. 29.

Automotive Cutbacks Dampen Outlook

OCTOBER's industrial performance supplied little momentum for the rest of the quarter, but the outlook is not entirely dark.

While October was wobbling along, the government toted up September figures for new orders for durable goods and found they gained again after a strong rise in August. They represent future production. (See Page 92.)

In October, STEEL's industrial production index (above) held steady when it should have shown considerable vitality. (If seasonal factors were applied, the index would probably have dropped rather sharply.) Look for the Federal Reserve Board to announce another decline in its seasonally adjusted index for October. Only a strong buildup in the automotive industry has kept the index from plunging farther.

• **Cause of Decline**—It may well be that the automotive situation so far has covered up a situation more serious than many observers have recognized. It should be clarified in the next two months because auto production appears to be heading for a significant slump. If the total FRB index can withstand the loss of one of its principal supports without too much of a drop (a point or two during November and December), the economy can be considered in fairly good health. Otherwise, the much heralded recession will be an accomplished fact.

As almost everybody suspected, auto schedules were set unrealistically high in late summer. Ever since the week ended Oct. 15, the industry has fallen short of its goals. Production is still high, but cutbacks are becoming the rule rather than the exception.

• **Effects on Steel**—If last week was any indication, the slippage in motordom is going to make even October's relatively slow pace look good to steelmakers. The operat-

BAROMETERS OF BUSINESS

	LATEST PERIOD*	PRIOR WEEK	YEAR AGO
INDUSTRY			
Steel Ingot Production (1000 net tons)[2]	1,473[1]	1,545	368
Electric Power Distributed (million kw-hr)	14,000[1]	13,805	12,978
Bituminous Coal Output (1000 tons)	8,485[1]	8,510	8,101
Crude Oil Production (daily avg—1000 bbl)	6,750[1]	6,771	6,887
Construction Volume (*ENR*—millions)	$348.1	$400.2	$320.8
Auto, Truck Output, U. S., Canada (*Ward's*)	174,882[1]	169,703	124,442
TRADE			
Freight Carloadings (1000 Cars)	635[1]	637	588
Intercity Truck Tonnage (changes from year ago)	−1.5%	−1.4%	+5.1%
Business Failures (Dun & Bradstreet)	270	326	250
Currency in Circulation (millions)[3]	$32,120	$32,304	$31,873
Dept. Store Sales (changes from year ago)[3]	+4%	−4%	+7%
FINANCE			
Bank Clearings (Dun & Bradstreet, millions)	$27,497	$29,772	$25,512
Federal Gross Debt (billions)	$291.2	$287.5	$291.8
Bond Volume, NYSE (millions)	$30.0	$21.6	$32.4
Stocks Sales, NYSE (thousands of shares)	15,863	12,932	19,105
Loans and Investments (billions)[4]	$105.6	$105.6	$103.9
U. S. Govt. Obligations Held (billions)[4]	$27.8	$27.5	$28.5
PRICES			
STEEL's Finished Steel Price Index[5]	247.82	247.82	247.82
STEEL's Nonferrous Metal Price Index[6]	222.5	222.2	226.5
All Commodities[7]	118.9	119.0	119.3
Commodities Other than Farm & Foods[7]	127.6	127.6	128.6

*Dates on request. [1]Preliminary. [2]Weekly capacities, net tons: 1960, 2,849,306; 1959, 2,831,846. [3]Federal Reserve Board. [4]Member banks, Federal Reserve System. [5]1935-39=100. [6]1936-39=100. [7]Bureau of Labor Statistics Index, 1947-49=100.

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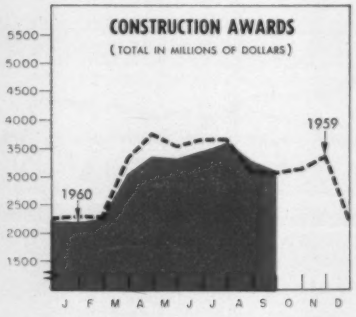
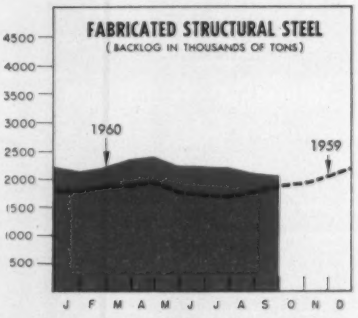


	Total		Building	
	1960	1959	1960	1959
Jan.	2,192.9	2,314.4	1,728.4	1,834.9
Feb.	2,239.5	2,307.0	1,685.1	1,777.4
Mar.	3,046.3	3,339.9	2,361.1	2,453.9
Apr.	3,359 8	3,778.4	2,527.3	3,018.0
May	3,336.7	3,541.9	2,562.5	2,748.8
June	3,472.3	3,659.0	2,592.8	2,816.9
July	3,596.9	3,656.5	2,481.2	2,880.8
Aug.	3,295.2	3,083.6	2,549.9	2,512.3
Sept.	3,118.8	3,058.1	2,401.8	2,472.3
Oct.	.....	3,144.5	.....	2,518.4
Nov.	.....	3,372.8	.....	1,893.0
Dec.	.....	.....	.....	1,783.4
Totals	.....	36,475.0*	.....	28,714.9*

*Monthly figures do not add up to totals because of yearend revisions.
F. W. Dodge Corp.
Charts copyright, 1960, STEEL.



	Shipments		Backlogs	
	1960	1959	1960	1959
Jan.	209.0	224.3	2,116	1,794
Feb.	240.9	216.1	2,189	1,864
Mar.	277.0	260.5	2,364	1,873
Apr.	286 9	290.6	2,401	1,922
May	284.6	294.1	2,237	1,768
June	332.7	365.4	2,219	1,717
July	301.2	238.6	2,203	1,679
Aug.	331.9	220.4	2,114	1,772
Sept.	323.5	182.6	2,058	1,871
Oct.	....	195.3	....	1,891
Nov.	....	180.8	....	2,068
Dec.	....	235.7	....	2,195
Total	....	2,904.4		

American Institute of Steel Construction

ing rate dipped to an estimated 51.7 per cent of capacity for the week ended Nov. 6 compared with 54.2 per cent the previous week. It was the lowest point since the Labor Day week. Point of more than passing interest: The biggest dip last week was in Detroit mills.

The only factor that kept STEEL's industrial production index from falling in the week ended Oct. 29 was the steadiness of electricity output. It is about ready to climb out of its seasonal trough, mainly because of the annual changeover to standard time. Cold weather and pre-Christmas sales promotions will continue to strengthen this index until late December. But it probably will not be enough to overcome the downward tendencies in other sectors.

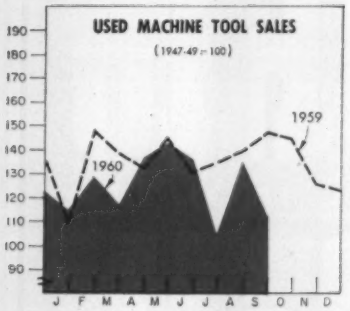
• **Carloadings to Plummet**—Railroad freight carloadings, which have been an encouraging index so far this fall, are weakening, as they usually do at the end of the fall harvest. Hovering close to the 635,000 car level for the last two weeks, they will sink when the Great Lakes ore boats end their season. Shippers could start to tie up next week (Nov. 10 is usually the turning point.)

Orders Post Second Gain

The gain in new orders for durable goods in September pushed them up to a preliminary $14.7 billion (seasonally adjusted). This is only slightly below the year's high set last February. Orders exceeded shipments ($14.3 billion) for the first time since last November.

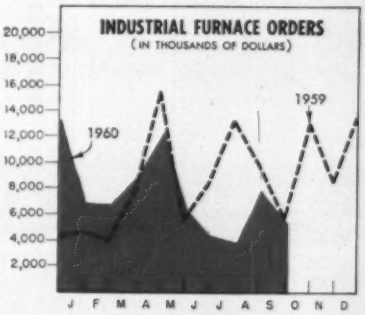
Orders for durables often indicate the direction of the general economy. The reliability of the indicator (it's one of the top "leaders") has been good in the postwar period, especially on the upturns. In 1948, new orders turned down in November, concurrent with the start of the 1948-49 general recession. They preceded the upturn by three months. In 1953-54, they led the downturn by six months, the upturn by four months. In 1957-58, orders dipped nine months ahead of the recession. They rose in March, 1958, and dipped again the next month (but still above the recession's low point) before starting a steady rise in May. The general recovery also started in May.

After reaching a peak in June, 1959, durable goods orders began a seesaw decline that took them to



	1960	1959	1958	1957
Jan. ...	115.0	109.5	121.1	n.a.
Feb. ...	129.3	148.1	121.9	n.a.
Mar. ...	117.8	139.3	106.3	n.a.
Apr. ...	137.5	132.9	105.0	152.1
May ...	143 2	145.7	99.5	132.6
June ...	137.2	131.3	111.9	137.0
July ...	106.0	135 3	115.0	125.3
Aug. ...	135.4	139.7	93.4	115.6
Sept. ...	113.3	147.8	113.6	117.0
Oct. ...	....	145.2	128.8	108.9
Nov. ...	....	126.8	122.3	104.5
Dec. ...	....	123.1	135.2	87.7
Avg ...	....	135.4	114.5	128.9

n.a.=not available.
Machinery Dealers National Assn.



	1960	1959	1958*
Jan.	6,827	4,545	3,047
Feb.	6,784	3,596	3,684
Mar.	9,033	7,842	2,871
Apr.	12,464	15,517	3,572
May	6,352	5,315	954
June	4,340	8,230	3,672
July	3,966	13,141	5,169
Aug.	7,840	9,738	3,533
Sept.	5,253	5,560	4,846
Oct.	....	12,967	3,105
Nov.	....	8,442	5,597
Dec.	....	13,437	4,284

*Does not include industrial ovens.
Industrial Heating Equipment Assn. Inc.

a low point last July. If the final analysis shows that a recession started with the decline in August's FRB index, orders once again score with a 13 month leadtime.

But the barometer is not infallible. From February through September, 1951, durables orders plunged from about $16 billion a month to $10.5 billion with no serious effect on the FRB index. On the other hand, the production index climbed rapidly between July, 1952, and July, 1953, while new orders zigzagged within a narrow range.

In the last 13 years, a two month rise in orders for durables following a sustained period of relatively low activity has generally resulted in a longer term pickup—although not always in a smooth curve. If the general rule holds in 1960—and if this barometer continues to lead the over-all trend by two to four months, economic conditions could improve in the fourth quarter.

However, it is dangerous to make business plans on the basis of one or two indicators. Next week's issue of STEEL will present the record of another leading indicator that can be combined with durable goods orders and machine tool orders (discussed on Page 51, Oct. 31 issue) to help forecast the general business trend.

Trends Fore and Aft

- The outlook for the construction industry is picking up. Contract awards in September were above the year ago month for the second consecutive time (see graph and table, Page 92). Despite a slight decline in September, bookings for fabricated structural steel are still ahead of the nine month total of 1959 by 7 per cent. Shipments are up 13 per cent. (See graph and table, Page 92.)
- During September (the month of The Machine Tool Exposition—1960) sales of used machine tools declined to the second lowest point of the year. (See graph and table above.)
- New orders for industrial furnaces declined in September (see graph and table above), bringing the cumulative total for 1960 to $62.5 million, 14 per cent behind the 1959 pace.
- Bookings of gears (another of the ten leading indicators) dropped to 197.9 per cent of the 1947-49 base period during September, reaching the lowest point since December, 1958.

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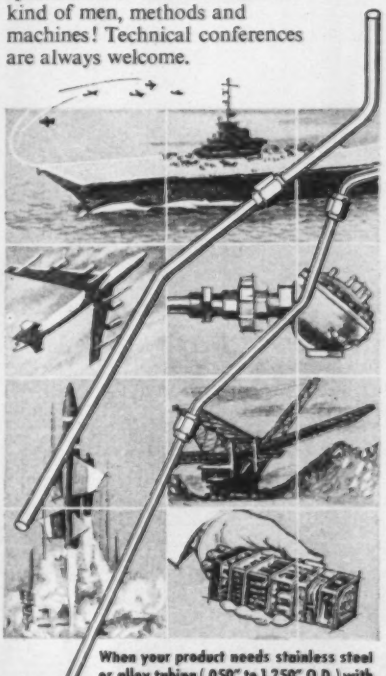

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WILLIAM B. CLARK
Norma-Hoffmann mfg. post

LORING S. BROCK
U. S. Steel Products pres.

Henry C. Daum was appointed vice president-sales, **Buhr Machine Tool Co.**, Ann Arbor, Mich. He was manager in the manufacturing engineering office, manufacturing staff, Ford Motor Co.

William I. Wilt was made vice president - marketing at **Sheffield Corp.**, Dayton, Ohio, subsidiary of Bendix Corp. He continues direction of advertising and publicity. **Richard Chaney** and **Edgar Hakanson** will assist Mr. Wilt as marketing managers. **Jack T. Welch**, vice president-sales, transfers to Bendix International, New York, as director of industrial marketing for the division. **Walter Burkart** was made manager of Sheffield's Machine Tool Div.

Charles A. Hathaway was appointed vice president of **Torrington Mfg. Co.**, Torrington, Conn. He is responsible for Connecticut and Indiana Air Moving Divisions. He has been assistant general manager of the Connecticut Div.

William B. Clark was named manager of manufacturing engineering, **Norma-Hoffmann Bearings Corp.**, Stamford, Conn. **Frank H. Rae** was made chief process engineer; **David Albert** superintendent of inspection and quality control.

Robert M. Lynas was named operations manager, Michigan Div., **Thompson Ramo Wooldridge Inc.**, at Detroit. He was manager of the Hydraulic Products Works, Michigan Div., in Cleveland.

Cleco Air Tools, Houston, appointed **Robert W. Sampson** sales manager of its new hard metals division, **CleMet Products.** He formerly served Cleco as a factory representative.

Ancel S. Page was elected vice president of **Dura Corp.**, Detroit. He is also general manager of Page & Page Co., division in Portland, Oreg., acquired by Dura last August.

Loring S. Brock was appointed president of **United States Steel Products Div.**, New York, U. S. Steel Corp. He succeeds **John Hauerwaas**, retired. Mr. Brock has been executive vice president since March, 1960.

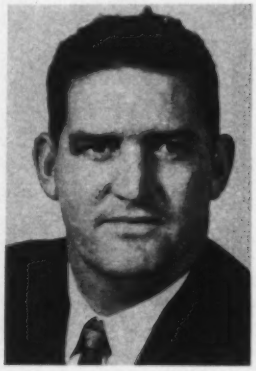
J. W. Broomhead was appointed general manager-production planning, Metal Div., **Continental Can Co.**, New York. He succeeds **Stewart A. Huge**, retired.

Carl H. Smith was named manager of sales engineering for **E. W. Bliss Co.**'s Canton, Ohio, Div.

Theresa Singer succeeds her husband, the late **Albert Singer**, as president of **Singer Steel Co.**, Cleveland.

Harry Turkington was named director of engineering, and **Hal Moore** was advanced to chief meter engineer, Meter & Controls Div., **Hickok Electrical Instrument Co.**, Cleveland. Mr. Turkington was

CHARLES A. HATHAWAY
Torrington Mfg. v. p.



ROBERRT W. SAMPSON
CleMet Div. sales mgr.

ANCEL S. PAGE
Dura Corp. v. p.

HARRY TURKINGTON
Hickok engineering dir.

R. WILLIAM ROSENQUEST
New Jersey Zinc post

FRANK A. BAKER JR.
Bethlehem Steel Div. eng.

WILFRED THOMPSON
Bullard v. p.-sales

WILLIAM M. WILLIAMS
Mack Trucks purchasing dir.

chief engineer, product application, for Simpson Electric Co.

R. William Rosenquest was made manager-metal sales, Eastern Div., **New Jersey Zinc Co.**, New York. **Charles H. Prince** was made manager-technical service, Metal Div.

Daniel M. Adams was promoted to assistant chief engineer, **Cadillac Motor Car Div.**, Detroit, General Motors Corp., responsible for current production. **Carl A. Rasmussen** was made assistant chief engineer, responsible for future development.

Hans M. Klopfer was made export sales manager for **Loewy Products,** Industrial Equipment Div., Baldwin-Lima-Hamilton Corp., Philadelphia.

Charles D. Kolkebeck was named material control manager at the Topton, Pa., manufacturing plant of **Caloric Appliance Corp.** He was director of purchases.

Frank A. Baker Jr., an assistant general manager of the Sparrows Point, Md., plant of **Bethlehem Steel Co.** for the last four years, was named chief engineer, Steel Div., with headquarters in Bethlehem, Pa.

Wilfred Thompson was made vice president-sales for **Bullard Co.**, Bridgeport, Conn. Since 1950, he has been Detroit district sales manager.

E. F. Hill was promoted to director of new products; **R. M. Frink** director of contract planning, a new post at **Wolverine Tube Div.**, Allen Park, Mich., Calumet & Hecla Inc. Mr. Hill was market manager. Mr. Frink was director of new products.

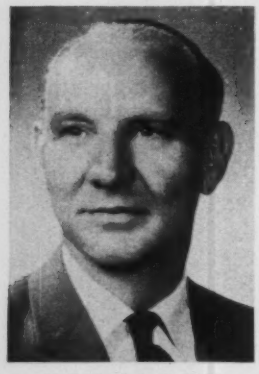
Roger S. Naeyaert, former vice president and general manager, was appointed president of **Drillunit Inc.**, Detroit. **William L. Defibaugh,** former chief engineer, was promoted to vice president-chief engineer.

William M. Williams was made director of purchases for **Mack Trucks Inc.**, Plainfield, N. J. He was director of purchases, Plumbing & Heating Div., American Radiator & Standard Sanitary Corp.

L. H. Orpin was made general manager of **Stromberg - Carlson Div.**, San Diego, Calif., General Dynamics Corp. He returns to Stromberg-Carlson after serving the last year as manager of planning for defense products for Radio Corp. of America. He previously served Stromberg - Carlson at Rochester, N. Y.

At the Benwood, W. Va., Works of **Wheeling Steel Corp., Clarence D. Thurnes** was made assistant to the divisional superintendent, production; and **William F. Williams** was made superintendent of finishing, warehousing and shipping.

Dr. Robert C. Brumfield was made director of engineering, **MHD Research Inc.**, Newport Beach, Calif. He was director of operations re-



CHARLES D. KOLKEBECK
Caloric material control mgr.

HANS M. KLOPFER
Loewy export sales mgr.

ROGER S. NAEYAERT
Drillunit president

DR. ROBERT C. BRUMFIELD
MHD Research eng. dir.

SURFACE POWER CONVECTION EQUIPMENT cuts Ross Gear forging process time 50%

High speed, high volume air circulation is the feature of this Surface continuous draw furnace, which enabled Ross Gear and Tool Company, Lafayette, Indiana, to

(1) process a wide variety of steering gear forgings much faster than with the batch type furnaces replaced. These forgings range from a few ounces to 22 pounds.

(2) draw forgings at rates to keep up with production in hardening operations.

(3) reduce handling operations, consequently reassign personnel to more productive jobs.

The furnace has three separately controlled zones, each with its own burners and fan. The uniformity of furnace temperature from zone to zone is consistently held within ±5°F.

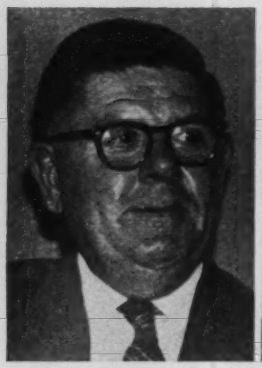
Mr. Leonard Ewalt, Chief Metallurgist of Ross Gear, reports: "The furnace will heat through a 2-inch section in approximately 40 minutes—just about as fast as the metal can take it when heated by convection . . . I would say that with this method of distributing heat in the zones and the rapid heating rate, this Power Convection furnace* is a couple of years ahead of its time.

We're not waiting for tomorrow, either. We're getting results today."

Write for bulletin SC-182. Surface Combustion, 2385 Dorr Street, Toledo 1, Ohio. In Canada: Surface Industrial Furnaces Ltd., Toronto, Ont.

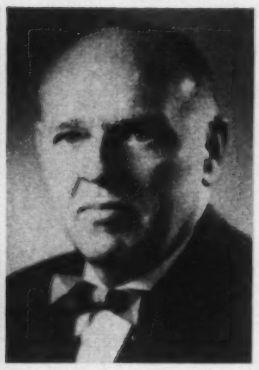
*Trademark of Surface Combustion, Division of Midland-Ross Corp.

Surface® *A division of Midland-Ross Corporation* MR

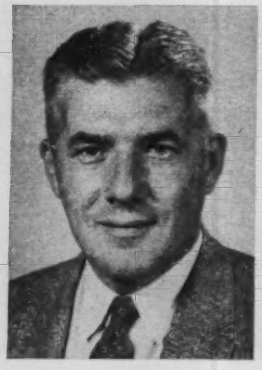


SAMUEL E. DUNLAP
Pittsburgh Metals whse. post

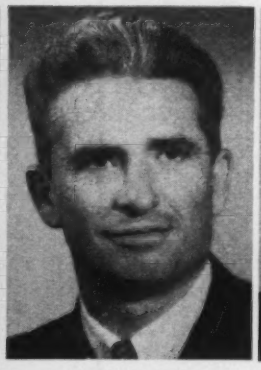
GORDON A. JACOBS
Detrex Chemical div. sales



ROBERT L. SMALLMAN
Servo v. p. marketing



CLARK NICHOLS
Leeds & Northrup post



JOSEPH R. ZAPPA
Union Drawn Steel supt.

HERBERT L. TYGESSON
Automatic Transportation sales

search for the Western Div. of Operations Research Inc.

Clark Nichols was made manager, Systems Engineering Div., **Leeds & Northrup Co.**, Philadelphia. He was head of the application engineering utilities section.

Joseph R. Zappa was named superintendent of Republic Steel Corp.'s **Union Drawn Steel Div.** plant in Los Angeles to succeed **George E. Yarnold**, retired. **J. Gordon Coffey** was made plant service manager at Los Angeles, and **Ralph A. Creter** was made plant metallurgist and field contact metallurgist for the West Coast.

Clearing Div., U. S. Industries Inc., Chicago, appointed **George Herrick** general sales manager-automotive sales, Detroit area; **Philip Delmer** general sales manager-domestic sales; **Louis Tuglas** manager-shear sales; **Dave Bonnar** manager-dealer press sales; **Dean Cochran** manager-hydraulic sales; **Stephen Miller** manager-machine tool sales.

Herbert L. Tygesson was made general sales manager, **Automatic Transportation Co.**, Chicago. He succeeds **R. D. Jones**, resigned. He was manager, Material Handling Div., American Pulley Co., division of Van Norman Industries.

Lawrence W. Lee was named chairman of **Gate City Steel Inc.**, Omaha, Nebr. He succeeds **N. R. Knox**, resigned.

Richard S. Smith, president, **Rigidized Metals Corp.**, Buffalo, assumes responsibilities of acting general sales manager following the recent death of **Robert G. Leary**, vice president-sales.

George H. McElroy fills the new post of sales manager, Metals Dept., Chemicals Div., **Glidden Co.**, Cleveland.

Edward T. Connor was named vice president - marketing, **Instrument Development Laboratories Inc.**, Attleboro, Mass. He was manager, new product planning.

Samuel E. Dunlap was made general manager, Warehouse Div., **Pittsburgh Metals Fabricating Co.**, Sharpsburg, Pa., in charge of steel warehouse sales.

Detrex Chemical Industries Inc., Industrial Sales Div., Detroit, appointed **Gordon A. Jacobs** sales manager; **Paul W. Moehle** product manager of industrial solvent sales and co-ordinator of jobber relations; **Bruce A. Young** product manager, industrial equipment sales. **David E. Williard** was made special assistant to the vice president-sales.

Robert L. Smallman was named vice president-marketing of **Servo Corp. of America**, Hicksville, N. Y. He served in a similar capacity for the last 13 years with Consolidated Electrodynamics Corp.

Robert J. Rodwell was named manager of marketing at **General Electric Co.'s** General Purpose Control Dept., Bloomington, Ill.

Keith D. Evans was made manager of the newly created Product Reliability Div. of **Hercules Motors Corp.**, Canton, Ohio. He has been **with Hercules Motors for 18 months as manager of quality control.**

P. T. Bloodsworth was made Eastern sales manager for **Kaiser Steel Corp.**, New York.

Earl D. Weaver was appointed plant manager, **Cross Perforated Metals** plant, Reynolds Div., National-Standard Co., Carbondale, Pa. He joined National-Standard in 1955 as a project engineer in the firm's Niles, Mich., plant. He transferred to Cross in 1958 as chief engineer.

OBITUARIES...

Arthur Lehr, 54, president, **Bliss & Laughlin Inc.**, Harvey, Ill., died Oct. 29.

Paul P. Huffard, 72, former vice president, **Union Carbide Corp.**, New York, died Oct. 30.

Robert E. Wicen, 39, manager, Conveyor Component Sales Div., **Chain Belt Co.**, Milwaukee, died Oct. 25.

Reeves completes redesigned Motodrive line with 25, 30 and 40 hp. "600" in addition to

¼	½	¾	1	1½	2	3	5	7½	10	15	20	HP.

UP TO **40** HORSEPOWER **NEW** UP TO **40** HORSEPOWER **NEW** UP TO **40** HORSEPOWER **NEW** UP TO **40** HORSEPOWER **NOW**

AVAILABLE

The Reeves adjustable speed "600" gives you up to 3:1 speed range. Infinitely variable output speeds as high as 2150 rpm. or as low as 76.5 rpm., with speed reducer. Full line provides hundreds of space-saving assemblies, manual or automatic controls. Write for complete information.

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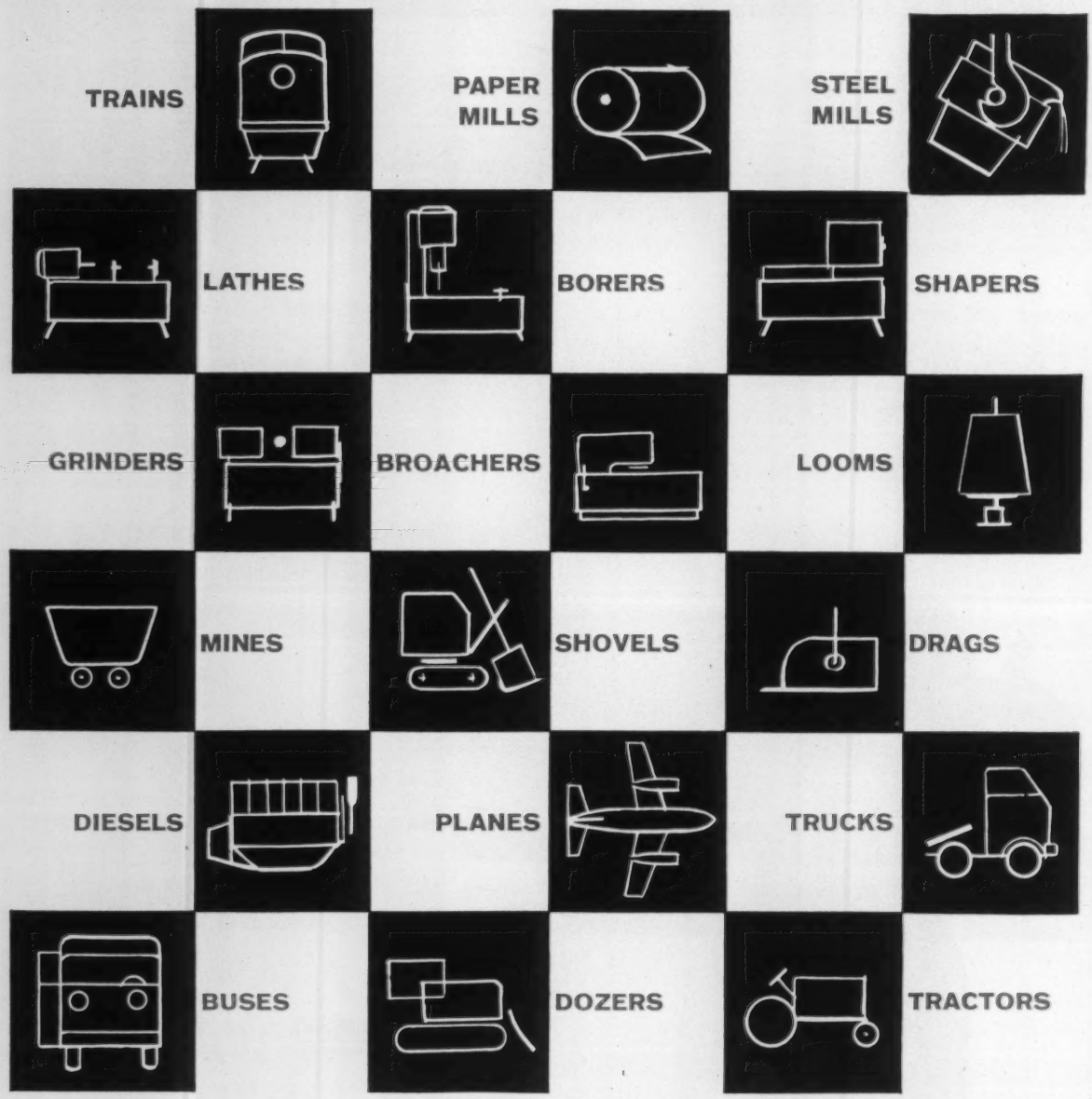

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Bridgeport Brass to Open Plant in Northern Ireland

BRIDGEPORT BRASS CO., Bridgeport, Conn., has formed Bridgeport Brass Ltd., London, to operate a plant in Northern Ireland for the manufacture of tire valves, bicycle valves, and accessories.

Austin R. Zender, Bridgeport Brass president and chief executive officer, says the British affiliate will occupy a 73,000 sq ft government plant at Lisburn near Belfast, the principal seaport of Northern Ireland.

The company will start installing equipment in February and plans to place the plant in partial operation by July. Full operation is expected within two years. Most of the equipment will be purchased in the United Kingdom (some special machinery cannot be obtained there).

The Lisburn facility will not interfere with Bridgeport Brass Co.'s tire valve operation in Connecticut, says Mr. Zender. Products manufactured in Ireland will be sold principally on the European market. The parent firm formed Bridgeport Brass International Corp. A.G. in June and established headquarters for it in Zug, Switzerland.

Officers of Bridgeport Brass Ltd. include: Chairman and managing director, Austin R. Zender; general manager, J. F. Donnelly; secretary, J. S. Dawson; treasurer, W. J. Faust; and controller, D. C. Bell

Organizes Union Chain Div.

Hewitt-Robins Inc., Stamford, Conn., established a Union Chain Div. at Sandusky, Ohio, for the manufacture of roller and conveyor chain.

To Build Chemical Plant

Columbia-Southern Chemical Corp., a subsidiary of Pittsburgh Plate Glass Co., Pittsburgh, will construct facilities for the production of certain chrome chemicals at Corpus Christi, Tex. The multimillion dollar plant will complement Columbia-Southern's facilities for chrome chemicals at Jersey City, N. J.

Forms Special Products Div.

Huck Mfg. Co., Detroit, formed a marketing and manufacturing division under the direction of A. W. Ackerman Jr. The Special Product Div. will produce and sell close tolerance, cold headed and roll formed parts on special order. The firm is equipped to produce parts made from wire having diameters up to 1 in. in aluminum or carbon steel and up to ¾ in. in stainless steel.

Two Firms Change Names

Skinner Chuck Co., New Britain, Conn., changed its name to Skinner Precision Industries Inc. The firm's Chuck Div. is now designated Skinner-Horton Chuck Div. (The name of the Skinner Electric Valve Div. was not changed.)

Miller Steel Co. Inc., Hillside, N. J., changed its name to Miller Steel & Aluminum Div., Robert Campbell Co. Inc.

Plating Firm Expanding

Keystone Chromium Corp., Buffalo, plans to purchase the Trico Products plant at 990 Niagara St., that city, for an expansion of its plating operations. Facilities in its leased, No. 2 plant at 1122 Niagara St. will be moved into the Trico plant and will be doubled in size.

Alcoa Installs Press

Aluminum Co. of America, Pittsburgh, has placed in operation an electronically controlled extrusion press at its Vernon (Calif.) Works. The 5200 ton press is the heart of a $5 million expansion of extrusion facilities and enables Alcoa to produce and process extrusions up to 34 sq in. in cross-sectional area at that plant. The multimillion dollar program also includes a 750,000 lb capacity stretcher and a building to house the press and its supporting equipment.

Central Steel to Build

Central Steel & Wire Co. has completed a 101,000 sq ft addition to its warehouse at 3000 W. 51st St., Chicago 80, Ill. The service center contains 700,000 sq ft of floor space and is equipped with specialized cutting equipment. It stocks carbon, alloy, and stainless steel products; and brass, copper, and aluminum items.

Bostitch Plans Wire Mill

Universal Wire Co., Stamford, Conn., a subsidiary of Bostitch Inc., plans to build a wire mill at Clinton, Conn. The plant will contain about 100,000 sq ft of floor space and will produce a substantial part of Bostitch's requirements of stapling wire and attaching wire. At normal production rates, Bostitch consumes about 30 tons of wire a day in the manufacture of staples alone.

Gabriel Unites Divisions

Gabriel Co., Cleveland, is integrating its Bohanan Div., Compton, Calif., with that of Rocket Power-Talco Div., Mesa, Ariz. All engineering and manufacturing facilities dealing with rocket powered and cartridge activated systems will be concentrated in a single location under the direction of C. E. Bartley, president of Rocket Power-Talco Div.

C&S Products Builds

C&S Products Co. Inc. (foundry equipment), an affiliate of Barber-Green Co., Aurora, Ill., added 3200 sq ft of space to its Detroit plant and offices.

GE Orders Vacuum Furnace

Research Laboratories, General Electric Co., Schenectady, N. Y., awarded a contract to General Vacuum Corp., East Boston, Mass., for the design and construction of a large scale vacuum facility. The furnace will be used for high temperature processing of Space Age materials under controlled, ultrapure, vacuum conditions. The sus-

ceptor assembly will provide temperatures above 4500° F in a zone more than 1 ft in diameter and 2 ft high. The vacuum system will operate in an area equivalent to an altitude in excess of 100 miles. The equipment will enable Research Laboratories to accomplish metallurgical operations with tungsten, tantalum, and other high temperature materials on a production scale.

Buys Aluminum Foil Mills

Pittsburgh Engineering & Machine Div. (Glassport, Pa.) of Textron Inc. has been awarded a contract for the construction of three aluminum foil mills for the Hudson, N. Y., plant of General Electric Co. GE will produce its own aluminum foil for capacitors in a new $2 million installation at Hudson Falls. The four high stands will roll 30 in. condenser foil at speeds up to 2000 fpm. The three mills will produce 2 million lb of foil annually.

Enlarges Container Plant

Sherwin-Williams Co., Cleveland, is constructing a $650,000 addition to its metal container plant at Hubbard, Ohio. Capacity is being increased 3 million pails per year.

Meingast Makes Cylinders

H. M. Meingast & Sons Ltd. is operating a plant at Owen Sound, Ont., that produces hydraulic and pneumatically operated cylinders.

NEW OFFICES

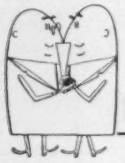
Vacuum-Electronics Corp., Plainview, N. Y., opened a field office at 3330 Barnham Blvd., Hollywood, Calif. The West Coast regional office is at 2701 Spring St., Redwood City, Calif. The company makes leak detection and high vacuum equipment.

Raytheon Co., Waltham, Mass., opened a commercial sales office at 7430 Second Ave., Detroit, Mich., and expanded the office at 3511 Hall St., Dallas, Tex. The Detroit office is headquarters for E. J. Kukula, district manager of the Distributor Products Div. and Robert Broderick, district sales manager for the Semiconductor Div.

ASSOCIATIONS

John E. Spears, Koppers Co. Inc., Pittsburgh, was elected president of the **American Coke & Coal Chemicals Institute**, Washington.

Industrial Heating Equipment Association Inc. moved its offices to 2000 K St. N.W., Washington 6, D. C.



CONSOLIDATIONS

MSL Industries Inc. will be the succeeding corporation of Minneapolis & St. Louis Railway following sale of its assets to the Chicago & North Western Railway. MSL will enter the fastener field through purchase of **Heads & Threads Inc.**, New York, and **Universal Screw Co.**, Evanston, Ill. The New York firm imports ferrous and nonferrous screws, bolts, nuts, and washers. The Evanston firm produces fastener specialties, largely in stainless steel and nonferrous materials.

Imperial Brass Mfg. Co., Niles, Ill., and **Eastman Mfg. Co.**, Manitowoc, Wis., have merged. Imperial makes tubing tools and brass fittings and valves. Eastman makes hydraulic lines and fittings for farm, construction, and road building machinery. Officers of the consolidated firm include: Chairman, F. C. Shafer; vice chairman, W. C. Schuknecht; and president, W. C. Musham.

Optical Gaging Products Inc. acquired **Automated Reproductions Co.**, developer of equipment for plastics etching on Plexiglas, vinyls, butyrates, and styrene. Both firms maintain headquarters in Detroit. Optical Gaging is a wholly owned subsidiary of Ex-Cell-O Corp., that city.

Directors of **Youngstown Steel Door Co.**, Youngstown, decided against consummating a merger agreement to acquire **Pipe Coupling Manufacturers Inc.**, Martins Ferry, Ohio.

General Electronic Control Inc., Minneapolis, acquired control of **Standard Electrical Products Co.**, Dayton, Ohio.

NEW ADDRESSES

Carpenter Steel Co., Reading, Pa., opened a mill-branch warehouse and specialty steel service center at 4901 W. 150th St., Cleveland, Ohio. C. H. Harton will direct operations at the warehouse and service center.

Elizabeth Sheet Metal Corp. moved to 624 Dowd Ave., Elizabeth, N. J. The company fabricates units and systems for the material handling and process industries.

NEW PLANTS

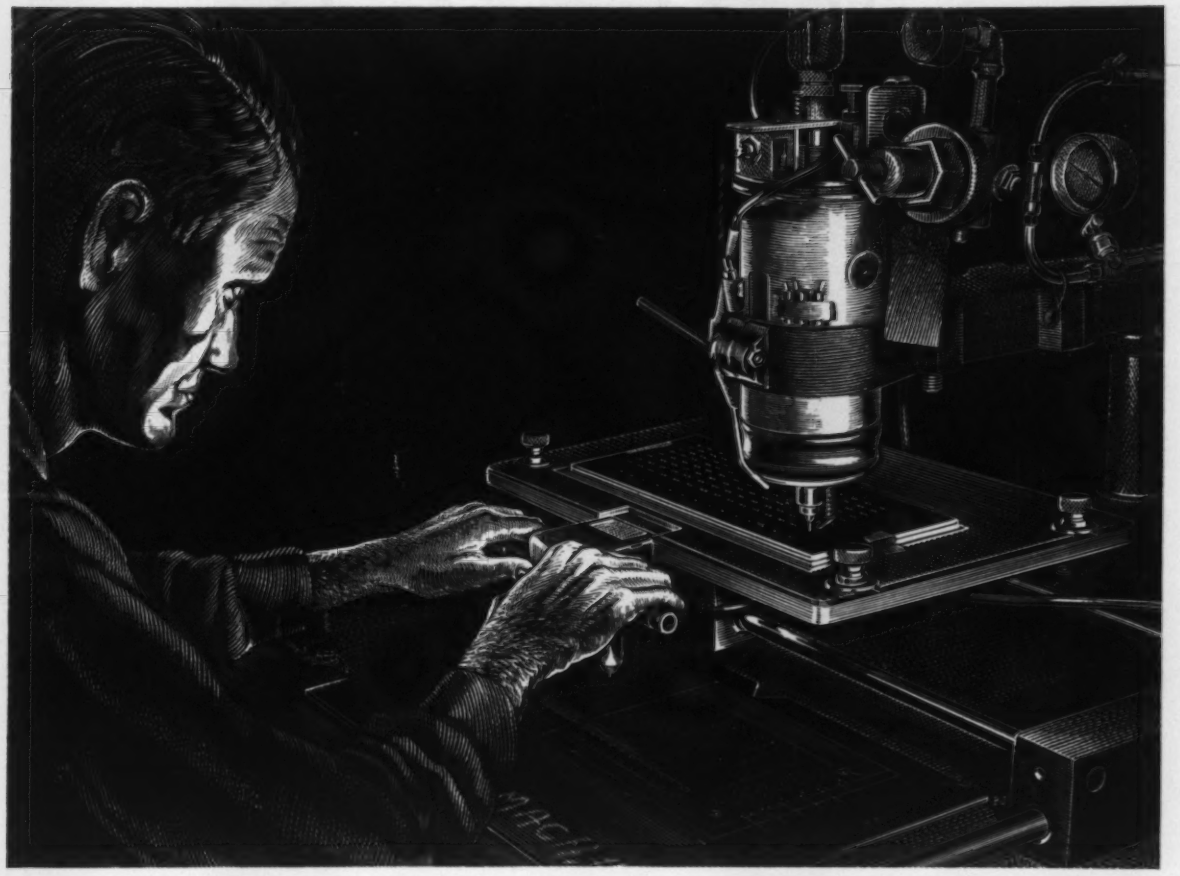
Aluma Kraft Mfg. Co. opened a 40,000 sq ft plant at 1030 Manchester Rd., St. Louis County, Mo. Plans call for the transfer of a 14 in. wide, roll coat paint line for siding and 48 in. wide roll forming equipment for awnings from the firm's main plant at 1330 N. Rock Hill Rd., Webster Groves, Mo., to the new plant.

Robertshaw-Fulton Controls Co., Richmond, Va., opened its $4 million plant near Youngwood, Pa. The 360,000 sq ft facility will be operated by the Robertshaw Thermostat Div. and will manufacture principally gas appliance controls.

Refractories Engineering & Supplies Ltd., Montreal, Que., will build new facilities at Bronte, Ont., to produce high magnesia, basic refractory mixes. The plant will be in operation early next year.

Cowles Chemical Co., Cleveland, is constructing a chemical plant in Joliet, Ill. The Promat Div. of Poor & Co., Waukegan, Ill., which was purchased by Cowles on Sept. 1, will be moved to Joliet when the plant is ready for occupancy next summer.

MORSE MAKES MILLIONS FOR PHILCO



. . . millions of tiny holes—precision-drilled by rugged, long-life Morse "Electrolized" Tools for Philco's fabulous Transac.

It's the world's first large-scale all-transistor computer – Philco's new Transac S-2000. Among its components: 18,000 printed circuit cards of epoxy resin glass fiber – highly abrasive, excessively wearing on the tools that have to drill hundreds of tight-tolerance holes in each card.

Philco uses the tools that are armored for rugged action: Morse "Electrolized" drills. More durable than high speed steel . . . more flexible than carbide . . . savers on down-time, replacement.

Morse will help you, too. Tell your cutting tool problem to your Morse-Franchised Distributor. He's the man with the answers.

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Warehouses in: NEW YORK • CHICAGO • DETROIT • DALLAS • SAN FRANCISCO

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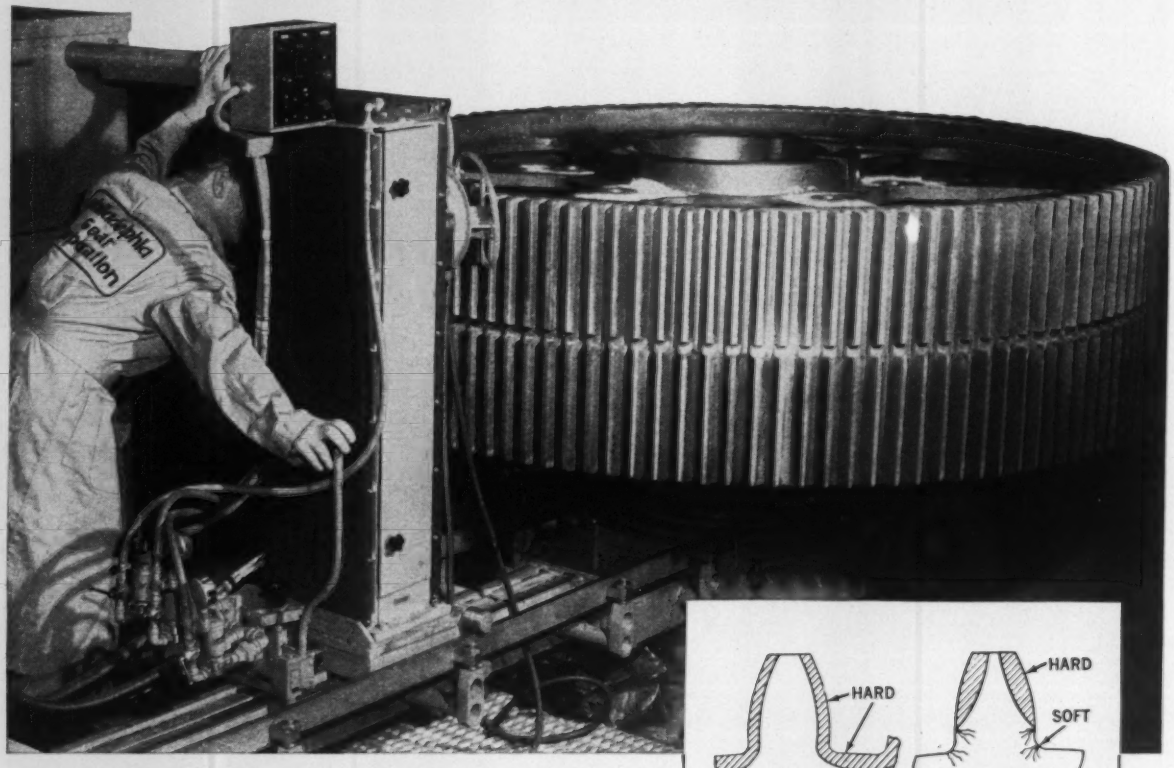
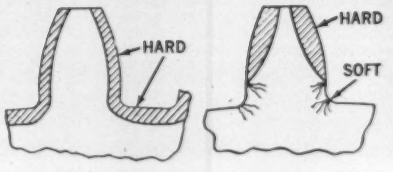
VN

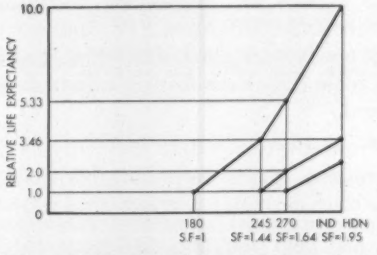
A Division of VAN NORMAN INDUSTRIES, INC.

New Philadelphia induction hardening increases life of large gear drives . . .





New Philadelphia full contour induction hardening (left) provides a continuous hardened area from one tooth flank around the root and up the other flank without interruption. There are no points of stress. Typical heat treated gear (right) shows inadequate hardening of root of tooth, a point of major stress.



This chart shows the relationship between load and gear life. Note that the improved service factor of a gear set may be used to substantially increase gear life, rather than to increase the load.

HERE'S WHY: Full tooth contour induction hardening of large gears provides a uniformly hardened surface from one tooth flank around the root and up the other flank without interruption. Eliminates points of thermal stress concentration. And there is no distortion, a problem of heat treated gearing that requires subsequent grinding.

This new, advanced Philadelphia method permits radical reduction in sizing and/or increased load carrying capacities. And it can easily harden even the largest spur, helical and herringbone gearing up to 180 inches in diameter, 20 inches in face, and 3/4DP.

Learn more about this new method for increasing the service life of your gear drives. Write for your copy of Bulletin 100.

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King of Prussia (Suburban Philadelphia), Pennsylvania

Technical Outlook

ALLOY STEEL IN L-D SHOP—Many electric furnace alloys and all open hearth steels eventually will be made by a basic oxygen process, say O. Cuscoleca, technical director, and K. Rosner, manager, Oesterreichisch-Alpine Montangesellschaft, Leoben, Austria. The firm's Donawitz plant has produced case hardening and heat treating steels, low alloy tool steels, bearing steels, and electrical alloys.

TANTALUM NOTE— As a structural material base for temperatures over 2000° F, tantalum appears to have several excellent advantages: Low ductile-to-brittle transition temperature, high melting point, high density, and it forms a refractory oxide. Some progress has been made in utilizing the element as a base for a series of alloys, reports Battelle Memorial Institute, Columbus, Ohio.

VALUABLE ADDITION— Platinum or copper in Type 304 stainless steel improves its resistance to uranium sulfate or nitrate solutions in atomic reactors, state research people at Oak Ridge National Laboratory, Oak Ridge, Tenn. Results depend on solution velocity as well as composition, they report.

ROLLING IMPROVEMENTS— A continuous x-ray check during hot rolling of billets (up to 8 in. square) improves quality and cuts waste, claim engineers at Phoenix-Rheinrohr AG, Dusseldorf, Germany. In its installation, billets move through a 31 MeV betatron. The x-ray image is observed on an industrial TV system. Results: 50 per cent of all holes 0.118 in. thick and 90 per cent of all holes 0.276 in. thick are detected, says N. V. Philips' Gloeilampenfabriken, Eindhoven, Netherlands.

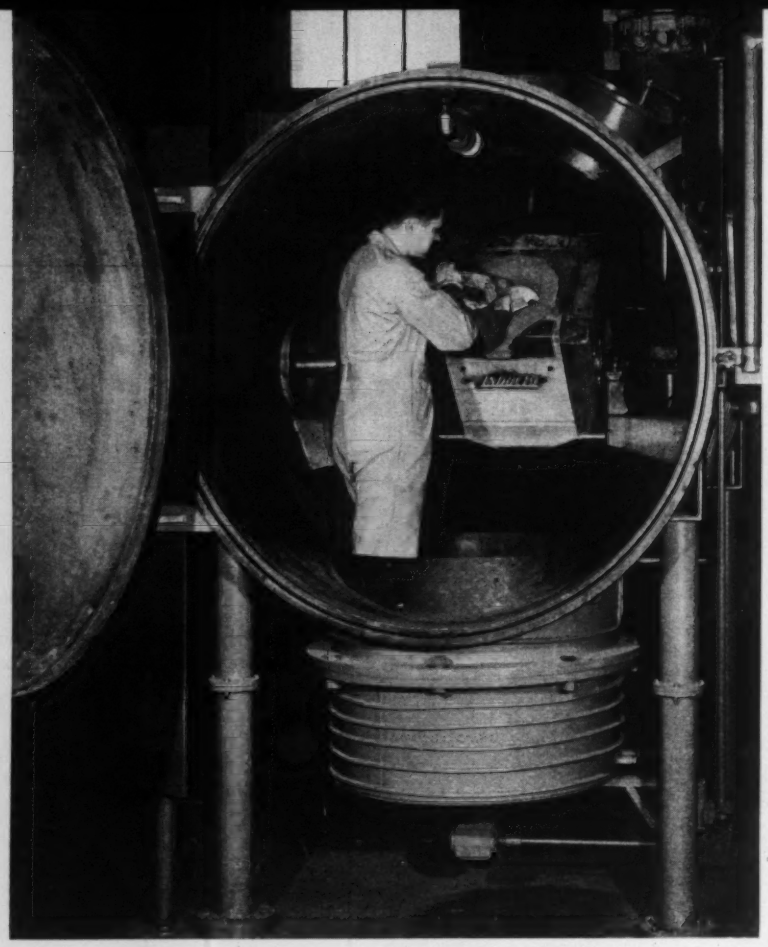
COKE FROM SOFT COAL—A blend of 3 parts Illinois high volatile to 1 part West Virginia low volatile coal makes good blast furnace coke, claims Granite City Steel Co., Granite City, Ill. Despite a 4 or 5 per cent lower yield, the mixture produces coke which has the right strength, size, surface characteristics, and expansion pressure for stack use, a company spokesman asserted at a regional meeting of the American Iron & Steel Institute, Chicago.

SPACE FORECASTS—Look for these developments in the manufacture of space vehicles: More success with beryllium and titanium alloys; increased use of sheets for builtup structures; more applications of glass fiber reinforced plastics, weldments, and assemblies of small forgings; more composite structures (honeycomb, laminates, claddings); more ceramic coated structures. Another prediction: By late 1963, welding will be the most used joining method. Source: Aerospace Industries Association, Los Angeles.

SLOWDOWN FOR SPEEDUP— Chances are better than even that you're running coated abrasive belts too fast, say experts at Behr-Manning Co., Troy, N. Y. They advise: Speeds are generally nearly double those that would give best belt life and metal removal rate.

REFRACTORY RESEARCH— "All major refractory companies are spending large sums on research. Up to 4 cents of every sales dollar is being devoted to the search for better and more uniform products," says John J. Schanz Jr., associate professor of mineral economics, Pennsylvania State University, University Park, Pa. He predicts: Replacement of natural with artificial refractories; new applications of single and double oxides, carbides, and nitrides.

TITANIUM TONGS—Try titanium tools for handling hot jobs, suggests Atlas Steel Ltd., Welland, Ont. The firm is switching to the metal for these reasons: It is half the weight of steel (improves worker efficiency); its high energy absorption and high yield strength cut rough handling damage, reduce maintenance costs; low heat conductivity keeps handles cooler.



This vacuum induction furnace, used as a research tool, melts heats as large as 300 lb. Ten years ago, it might have been used for production melting

Future Looks Favorable For Vacuum Steelmaking

LOOK FOR vacuum melting and degassing equipment to become even more popular with steelmakers in the sixties as the demand for high quality material grows.

So say D. C. Ludwigson, metallurgist, and A. M. Hall, chief, Ferrous & High Alloy Metallurgy Div., Battelle Memorial Institute, Columbus, Ohio.

Pumping systems developed during World War II for uranium processing were a vital factor in the commercial growth of vacuum steelmaking in the last decade. Vacuum melting moved from the laboratory to the steel plant during the fifties. Later, when economics of vacuum melting were better defined, degassing became more popular for large heats.

• Vacuum methods are said to make cleaner steel with lower gas content; that makes for better mechanical properties.

Fatigue strength, ductility, and impact resistance appear most sensitive to improvement by vacuum processing; tensile strength isn't changed significantly, say the experts. Other factors that may contribute to property improvements: Better compositional control, freedom from segregation, and purer melting charges.

But better properties aren't obtained automatically by vacuum melting. In some cases, aircraft quality, air melted steel has better properties than carelessly prepared vacuum melted heats.

"The superior quality of vacuum melted or degassed steels is often offset by their higher cost," say Messrs. Hall and Ludwigson. "Vacuum melted steels may cost twice as much as air melted metals, or even more. Vacuum degassing can usually be done for $2 to $20 a ton.

"But the higher yield available with vacuum processed material often permits a reduction in the premium. In other cases, smaller sections of the higher quality product can be specified."

• Vacuum melting is specified when the application calls for the highest quality material available.

Composition sensitive alloys are usually vacuum induction melted; those alloys sensitive to segregation are more often remelted in a consumable electrode, vacuum arc furnace. Both processes offer extremely low gas and inclusion content; but ability of the arc furnace to turn out larger heats causes it to be favored in steelmaking.

Vacuum melting is said to improve transverse ductility of low alloy steels more than longitudinal ductility. Example: An air melted heat of AISI Type 4340 steel, hardened to an ultimate tensile strength of 285,000 psi, had a 17 per cent transverse area reduction and a 35 per cent longitudinal area reduction. Transverse area reduction was increased to 40 per cent, longitudinal area reduction to 41 per cent by vacuum induction melting. Similar improvements have been noted in AISI Types 6150 and 9310, in AMS Type 6263, and in Nitralloy. Bearings of vacuum induction melted AISI Type 52100 steel are said to be superior in service life to those made of air melted material.

Chromium, hot work die steels show improved ductility and notch strength ratios when they are vacuum melted. They also have lower transition temperatures.

In limited studies, stainless steels had better impact strength after vacuum induction melting; ductility and strength were improved by vacuum arc melting.

Iron base superalloys are said to be much improved by vacuum arc remelting because of absence of segregation. Ductility is improved in A-286, N-155, and W-545; fatigue strength in A-286; and rupture strength in W-545.

• Degassing doesn't offer the improvement available in vacuum melting, but it permits large heats to be upgraded at reasonable cost.

In vacuum stream degassing, an ingot mold or secondary ladle is placed in a large chamber, which is then covered and evacuated. A bottom pouring pony ladle is placed on top of the chamber, above the mold or secondary ladle. As the molten metal pours through the vacuum chamber, it breaks into fine droplets, which are exposed to the vacuum. The process is used at the Bethlehem (Pa.) plant of Bethlehem Steel Co. and at the Duquesne (Pa.) Works of United States Steel Corp., to cast ingots directly. At Erie Forge & Steel Co., Erie, Pa., the stream is caught in a ladle and cast later.

Stream degassing is said to reduce hydrogen content and make it unnecessary to age low alloy steels sensitive to hydrogen embrittlement. It is also said to reduce the size and frequency of nonmetallic inclusions.

Ladle degassing is practiced at A. W. Finkl & Sons Co., Chicago, to reduce hydrogen content of 35 ton heats of steel for die blocks. Helium is bubbled up from the bottom of the ladle, which is in a vacuum chamber, to wash out the hydrogen and create a vigorous boil. That continually brings new metal to the surface for vacuum treatment.

• Cyclic degassing will be practiced at the Midland (Pa.) Works of Crucible Steel Co. of America, and at National Forge Co., Irvine, Pa.

Dortmund Horder degassers, developed in Germany and marketed in the U. S. by Lectromelt Furnace Div., McGraw-Edison Co., Pittsburgh, remove oxygen and hydrogen from molten steel. The process features a lined degassing vessel with a suction nozzle on the underside. When the vessel is lowered (or the ladle of steel is lifted), steel enters the degassing chamber; when the vessel and ladle are parted, the steel returns to the ladle. The cycle is repeated until the steel reaches required cleanness.

Vacuum Arc Upgrades Steels, Alloys

SUPERSTRENGTH steels and alloys for critical, Space Age applications are being produced in a new, consumable electrode, vacuum arc remelt furnace at Standard Steel Works Div., Baldwin-Lima-Hamilton Corp., Burnham, Pa.

Built and installed by Lectromelt Furnace Div., McGraw-Edison Co., Pittsburgh, the furnace produces ingots weighing 6000 to 20,000 lb, in 16, 20, 24, and 30 in. diameters.

• The furnace permits production of materials with superior cleanliness and minimum segregation. They're virtually free from harmful gases.

The new unit, which supplements an air melt, electric arc furnace and a vacuum stream degassing facility installed in the late fifties, permits the division to turn out materials for almost any high stress, high temperature application. It produces an ingot by continuously depositing liquid steel in a water cooled mold by discharge of a low voltage, high current arc.

"Nonmetallic inclusions are greatly reduced in size and number," says P. A. Archibald, chief metallurgist for Standard. "Physical properties are also improved; that makes for better hot strength and cold workability, higher ductility, and lower notch sensitivity."

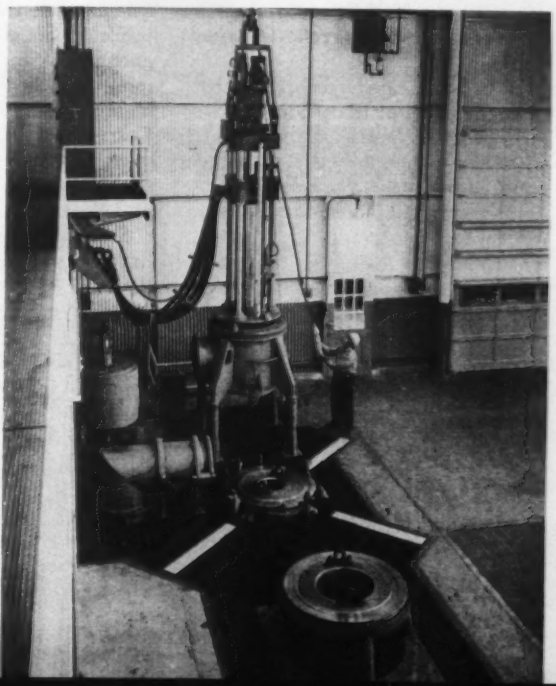
Ingot soundness and homogeneity are also improved. Progressive solidification of the remelted product—from the bottom up—is said to virtually eliminate center shrinkage and reduce chemical segregation.

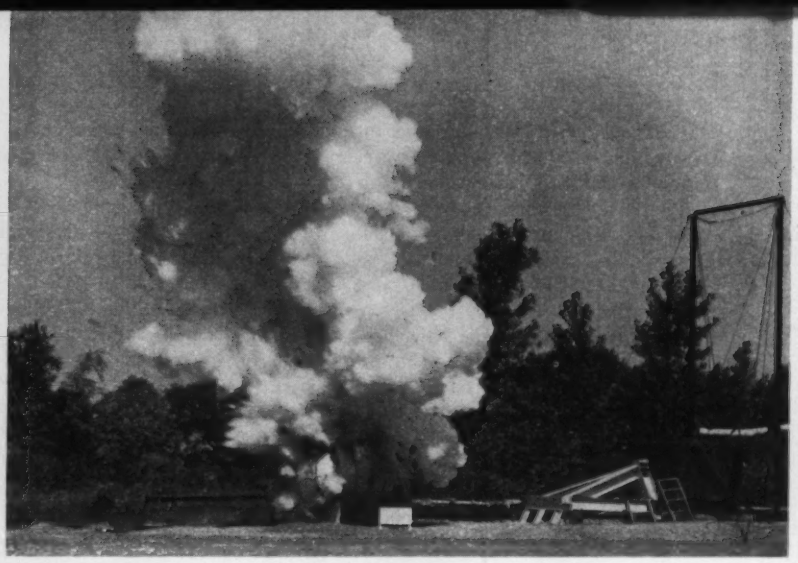
• The biggest demand for remelted steels and alloys is in the superstrength, low alloy grades for missiles and high alloy grades used in gas turbines.

Some cannot be made satisfactorily by conventional methods, says a Standard official. Example: Certain high temperature grades depend on titanium or aluminum for their ability to harden.

The vacuum melting facility also permits the division to supply ingots, billets, forgings, and rings for pressure vessels, missile cases, rocket engine components, gears, bearings, and tool steels.

Movable head of the remelt furnace is placed on support legs while the electrode and crucible are installed





This tank was ruptured by filling it with liquid nitrogen, then pumping to build pressure over 2000 psi. Flying debris is insulation

Welded Cryogenic Steel Takes Impact, Pressure

Demonstration shows 9 per cent nickel steel can take pressure and impact loading at −320°F, without stress relief after welding. Quenched and tempered plates used

VESSELS made of a quenched and tempered 9 per cent nickel steel give satisfactory service at cryogenic temperatures (−320° F) even though they are not stress relieved after welding.

U. S. Steel Corp. recently offered dramatic proof of that claim in tests at its Fairless Works in co-operation with International Nickel Co. Inc. and Chicago Bridge & Iron Co.

Interest in containers for low temperature gas storage is growing. The growth is mainly in the transportation and storage of missile fuels and oxidants, transoceanic shipment of liquid methane (STEEL, Oct. 21, 1959, p. 21), storage of natural gas during periods of low consumption, and storage of liquefied gases (chiefly oxygen) by large tonnage users.

• Safety is an additional advantage of cryogenic storage systems.

J. T. Horton, director of Chicago Bridge & Iron, gave some examples based on oxygen storage. To store 25 million standard cu ft of the gas at a pressure of 6 atmospheres, he calculated it would be necessary to use a spherical vessel 200 ft in diameter, 1½ in. thick, and weighing more than 2000 tons if it were made of a low alloy, high strength steel. Cost: More than $1.25 million. The energy stored in the pressure of the gas would be equal to 1500 lb of TNT.

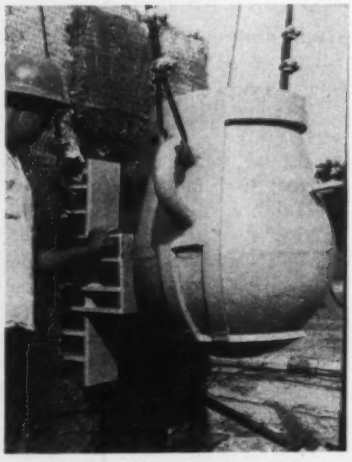
Storage of the same amount of oxygen as a liquid would drop the diameter of the sphere to 38 ft 9 in., Mr. Horton said. Only 25 tons of ¼ in. thick, 9 per cent nickel steel would be required. Counting 45 tons of insulation and a carbon steel outer sphere, total weight would be 145 tons. Cost: About $100,000. Since the pressure is atmospheric, there would be no stored energy.

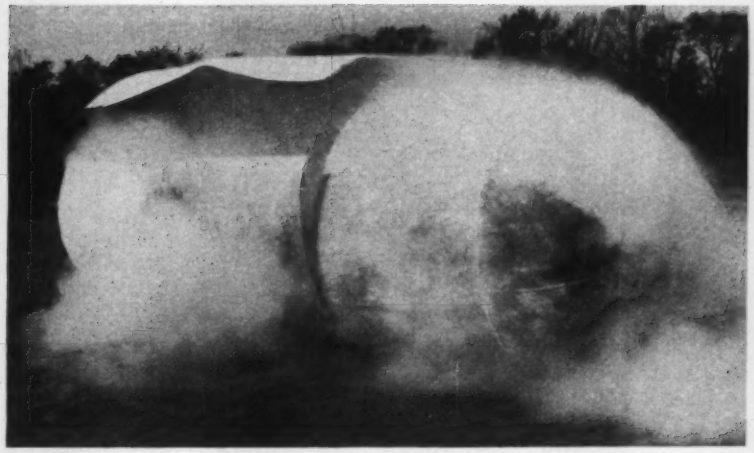
• The steel has been approved for low temperature service if the vessels are stress relieved after fabrication. One purpose of the tests was to show that stress relief can be eliminated without causing a safety hazard.

In small vessels, the problem of stress relief is primarily one of cost. Large field erected units pose another problem. They may require the building of a furnace around the vessel after it is in place.

About 200 vessels have been built from the 9 per cent nickel steel, starting with a liquid oxygen unit in 1952. W. T. Lankford Jr. of U. S. Steel's Applied Research Laboratory says all were small enough to be stress relieved in the shop after welding. So they meet ASTM spec-

Wrecking ball used in impact tests weighs 4340 lb





Tank after bursting shows nature of failure. Calculation of stress at time of break: About 130,000 psi

ifications A353 and A300. Heat treatment of the plates, before fabrication, was conventional for the specifications — double normalized and tempered.

• Adoption of quenched and tempered plates and the elimination of the stress relief operation after fabrication would trim costs further.

The double normalized and tempered heat treatment was adopted because of limited facilities for any other type of heat treatment, Mr. Lankford says. Mills are now in a position to supply the plates in a quenched and tempered condition. Elimination of the extra heat treating step is one means of cost cutting.

It was demonstrated that the as-welded tanks failed with a ductile type of fracture. That's one step in developing the necessary information for committees considering code revisions. Other laboratory data lead to the same conclusion. And the ductility at cryogenic temperatures, as judged by keyhole notch Charpy tests, is better for the quenched and tempered condition than for the double normalized and tempered. There is little difference in tensile strength but yield strength is better for the quenched and tempered alloy, both at room temperature and down to −320° F.

• Choice of alloy for cryogenic applications depends on the service intended and economic factors.

Stainless steels have been used for ultralow temperature processes for some time. Their alloy content makes them expensive compared with the nickel alloys; stress relief after welding is neither required nor prohibited under present specifications.

Other nickel alloys, with less than 9 per cent of the alloying element, have also been used for low temperature applications. Reducing the nickel content cuts the cost of the alloy, but it also reduces the minimum temperature at which they can be specified. A 2¼ per cent nickel alloy has been used for tanks and piping for liquid propane and other service down to −75° F; a 3½ per cent nickel steel is serviceable below −150° F. These alloys are covered by ASTM specification A-300 and by SA203 of the ASME Boiler & Pressure Vessel Code.

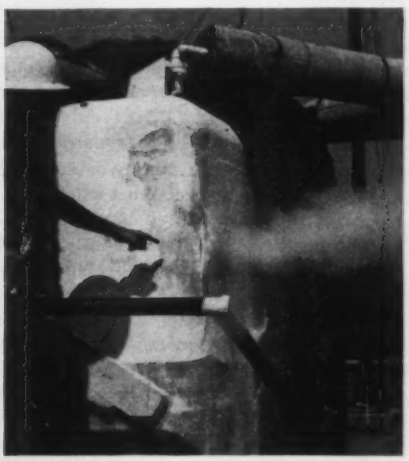
Designers can hold costs to a minimum by specifying only the amount of alloy needed to meet service conditions.

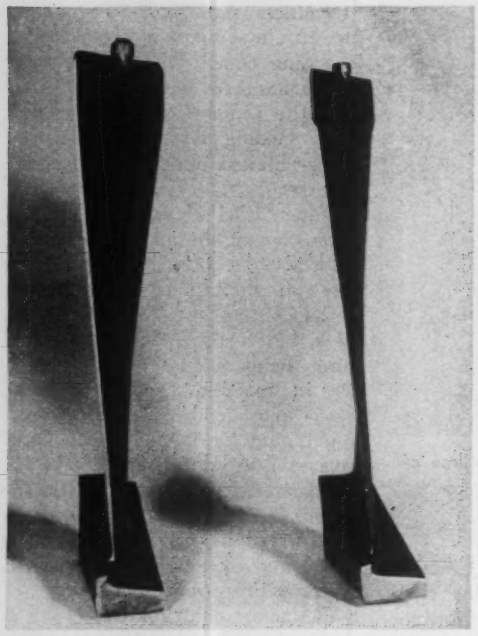
• Special positioning is not required for the welding of the 9 per cent nickel steel.

Engineers from Chicago Bridge & Iron Co. say it is possible to field weld the tanks. (Vessels used in the tests were welded without positioners.)

Electrodes recommended are identified as Inco-Weld A, either as covered electrodes for manual, metal arcwelding, or as wire for inert gas welding.

Vessel failure under impact releases liquid nitrogen. Impact force of more than 82,000 ft-lb acts through internal stiffeners to open crack at corner





These are Waspalloy, 11½ in. high, turbine blades —before and after electroshaping. Blade at left is as forged. Usually about 0.030 in. excess stock must be removed. Leading and trailing edges as thin as 0.005 in. have been produced

This is the machine used to shape turbine blades. The blade, in its fixture, is inserted into the plastic chamber. Two shaped electrodes, one on each side, are fed horizontally toward the work as metal is removed. The lines on top of the chamber deliver the electrolyte

ELECTROSHAPING:

New Approach to Chipless Machining

ELECTROSHAPING has joined the still-short list of unconventional manufacturing techniques that solve some of the problems that accompanied the advent of today's superproperty materials and complex shapes.

The process, announced last week (STEEL, Oct. 31, p. 35), has already proved itself economical on a production basis.

Says Aubrey H. Milnes, executive vice president, Steel Improvement & Forge Co., Cleveland, where electroshaping is being employed in the company's home plant to turn out jet engine turbine blades on a production basis:

Electroshaping is doing the job at 50 per cent of the cost of precision forging (in which tooling costs are high, tool life is short, and thin sections in high alloys are tough to make).

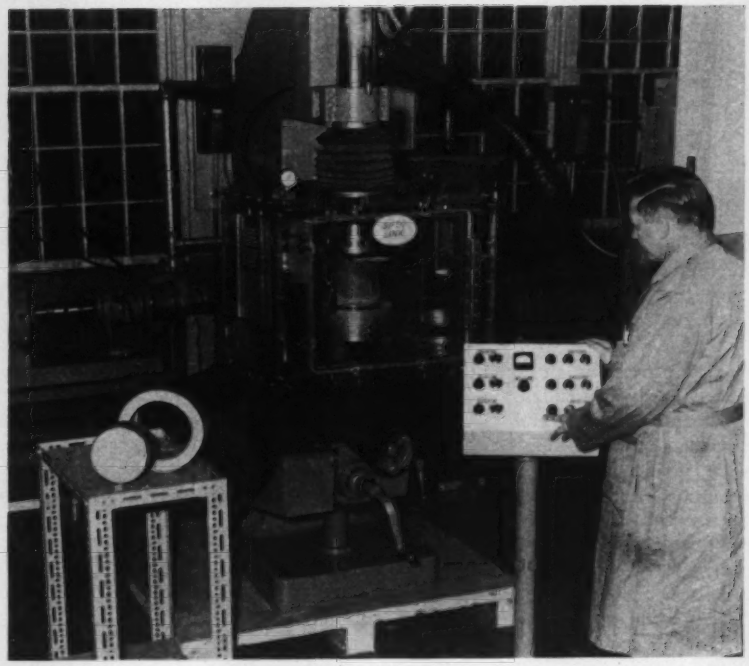
It's doing the job at about 70 per cent of the cost of precision machining (where machining stresses can be a problem, tooling costs can be high, and small quantity production can be uneconomical).

• The new technique: Electrolytic machining with good removal rates, close control over the contours generated, and simple setup and operation. It's called Sifco Shaping.

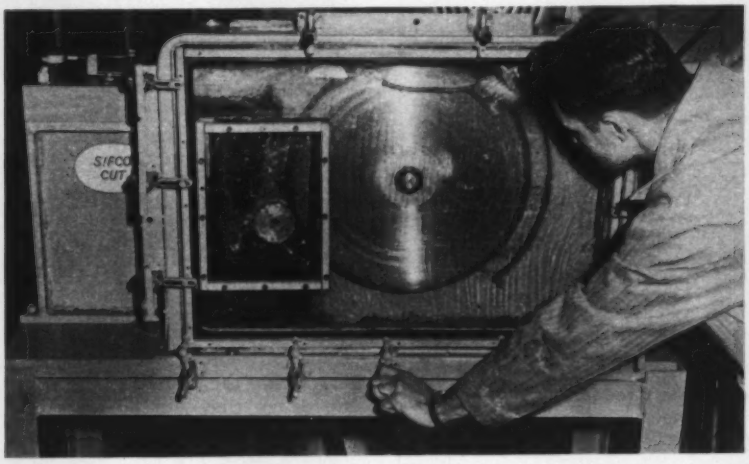
As in all electrolytic metalworking, Sifco Shaping is not affected by the hardness or strength of the metal—the one requirement is that the work be capable of conducting electricity. Parts can be shaped in the hardened condition as easily as in the annealed state. Metals like carbide, a variety of stainless steels, S-816, Waspalloy, Udimet 700, Nimonic, A-286, V-57, tungsten, and molybdenum can be worked.

Removal rates, governed by the amount of electric current applied, range around 0.05 to 0.1 in. a minute. Those rates, higher than conventional electrolytic processing, can be attributed to a rapid, thin-film flow of electrolyte that will support a current flow as high as 1500 amperes per square inch between the work (anode) and the electrode (cathode). High machining speeds put the new process in the competitive picture on many problem jobs. A forging die, for example, that takes 7 hours to machine conventionally can be electroshaped in 50 minutes. The faster the shaping is done, the smoother the workpiece's surface finish becomes.

The gap between the shaped electrode and the work is held to



On this machine, the electroshaping technique is applied to trepanning a 10 in. diameter, 4½ in. deep, tungsten missile case. A 7 in. center core is removed in less than 5 hours. A completed core and workpiece are shown on the table



A tungsten rod (framed by the smaller window) is cut off by a spinning stainless electrode wheel that's ⅛ in. thick. Spinning of the wheel shoots the electrolyte into the gap between the wheel and the workpiece. The job is completed in about 15 minutes—would take 3 to 4 hours conventionally

less than 0.010 in. (often in the 0.002 to 0.005 in. range). The contour of the electrode is reproduced on the work to tolerances between 0.0005 and 0.003 (approximate). Since no appreciable heat is generated in the work, distortion or stresses are not problems, and sections as thin as 0.005 in. have been shaped satisfactorily.

The entire operation takes place inside a closed plastic chamber. The operator loads parts in fixtures, inserts them in the chamber, positions the electrodes, turns on the electrolyte pumps, starts the current flow, and initiates the automatic feed that maintains the gap as the metal is removed. After a predetermined time, or an established feed distance, he shuts down the equipment and takes out the finished part. That's all there is to the cycle.

The electrodes can be any good conducting material. Most of the blade production at Steel Improvement has been done with stainless steel tools because they resist any corrosive tendency in the electrolyte. Graphite tools are being considered; they would be even more resistant to corrosion, easier to shape, but a bit fragile to handle. Since there is no direct contact with the work, and no electric arcing, tool wear is negligible. As many as 1000 parts have been run with the same electrodes with no appreciable wear.

• The potential goes beyond the straight, forming type jobs like die-sinking and airfoil shaping.

Turning, sawing, broaching, milling, trepanning, and internal shaping are among the other operations considered ideal for the new technique, says Dr. Cloyd A. Snavely, general manager, Sifco Metachemical Inc., affiliate of Steel Improvement.

Explains Dr. Snavely: "The electroshaping process is potentially capable of duplicating all of the common metal shaping operations in use today. It has added a new type of operation which promises designers much wider latitude in the choice of metal shapes which can be made economically."

The process was developed at Battelle Memorial Institute, Columbus, Ohio, under Steel Improvement & Forge sponsorship. The equipment is simple. The power supply also is uncomplicated. It's composed of conventional dc rectifiers.

The equipment is being built in Minneapolis by Custom Tool & Mfg. Co., a subsidiary. Each unit is tailored for specific applications.

C. H. Smith Jr., president of Steel Improvement & Forge, says: "Company technicians will be made available to prospective users to review with them particular applications of the new process, and to design prototype units for pilot production of parts in our plants. This way, we can explore and refine the necessary procedures before installing a machine in a customer's plant."

Forgings Milled Electrochemically

ELECTROCHEMICAL milling, like its newly announced electrolytic relative (Page 110), is a new rival of conventional machining. It was developed by North American Aviation Inc. to reduce or eliminate the machining time spent removing decarburization on high strength steel forgings. (STEEL, Apr. 4, p. 142).

The process has been refined to the point where it is considered a production process and it has been licensed to several other companies, say P. A. Oelgoetz and G. A. Clark of North American's Columbus, Ohio, plant.

Electrochemical milling is done by mounting parts in special tools, immersing them in electrolyte, and starting the current flow. After a time, the current is turned off and the parts are rinsed, and dried.

• The process is not complicated and is easily controlled.

Messrs. Oelgoetz and Clark say electrochemical milling is inexpensive, can be operated by unskilled personnel, and will reproduce contours with an accuracy limited only by that of the tool. In addition, the surface finish of parts is often improved. Equipment is limited to one, organic coated, steel tank and a low voltage generator—plus the equipment for cleaning.

The ease of process control is attributed to a single electrolyte that operates at room temperatures. The amount of material dissolved into the bath produces no detectable change in the etch rate. As an example, a tankful was used the equivalent of a three-quarter shift-year with no change in rate of metal removal or required voltage. Also, no additions (except water) were made.

The cost of processing, spokesmen say, is almost insignificant when compared with the cost of conventional metal removal. Constant attention is not necessary and only 18 kilowatt hours of electricity are required to remove a pound of metal.

Reproduction of contour is consistent if the forgings do not contain large variations from part to part. Where variation exists, it's practice at North American to measure and segregate parts prior to milling—then set the cycle times for each of the part groups.

• Etch rate is controlled two ways.

A change in either the operating temperature or the current density will alter the machining rate. Since a room temperature operation is generally preferred, North American technicians have worked most on varying the current. The working range they use produces etch rates in the range of 0.00015 to 0.00038 in. a minute. The minimum rate was chosen because the lowest practical speed—the upper rate reflects "expediency and equipment cost limitations."

The rate also affects surface finish. At the low rate, the surface is considered acceptable. At the maximum rate, a 30 microinch rms finish is readily obtained.

North American is not revealing details on the tooling. It has admitted that tools "must be made accurately, must incorporate means of achieving good current distribution, and must have good electrolyte circulation."

How the Processes Compare

Both chemical milling and electrochemical milling are closely identified with North American Aviation Inc. This table, prepared by two of the company's engineers, shows how the two processes are similar—and how they differ

	Chemical Milling	Electrochemical Milling
PERFORMANCE		
Edge definition on parts	Variable	Consistently good
Surface finish produced	Good as the basic material	Better than the basic material
Radii	Sharp edges are retained	Sharp edges made into radii with proper tooling
Duplication of end product	No control	Constant
Embrittlement	Generally slight	None
Intergranular attack	Can be a problem	None
EQUIPMENT		
Etch tanks	Coated steel	Coated steel
Power supply	None	Generators for about 12 amperes per square inch at 12 volts
Tank maintenance	May run about 50 per cent downtime	None
Maskant	A 0.012 in. minimum layer; 3 hour bake	Less expensive than for chemical milling

The hard-boiled coating that couldn't be cracked

". . . boiled in water for one year without film failure or softening", excerpt from Glidden lab report on a special new coating system.

Tortures such as this are common in the Glidden laboratories where maintenance coatings are tested and proven. With good reason, too, because these coatings must stake their reputations on high performance standards.

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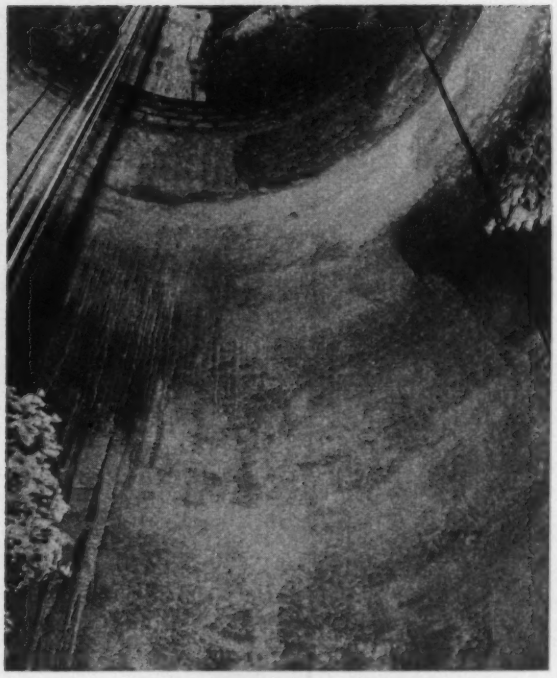
Most blast furnace campaigns are ended when lining bricks in the stack are worn and broken like these



But castable refractory material, applied over the old lining, may keep the furnace in use for another three years

Blast Furnace Campaigns Extended with Castables

GUNNING of castable refractory materials on worn blast furnace linings can extend campaigns two to three years, even longer, says Harbison-Walker Refractories Co., Pittsburgh.

The company offers a complete line of castables for stacks, each tailored for service in a particular area.

Use of castables is said to save usable brickwork still in the stack, and it saves time. A typical brick relining job might take two months or more vs. ten days for a complete castable installation.

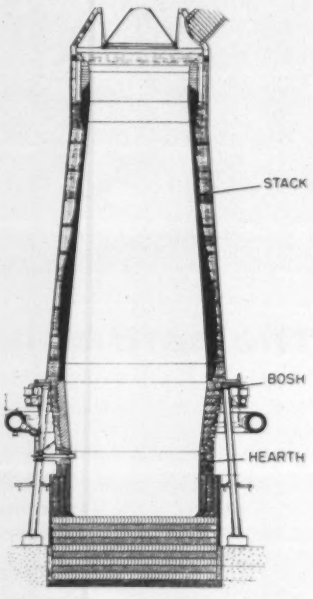
• Successful use of monolithic linings at several steel plants is said to be speeding their acceptance in planned maintenance programs.

Example: A merchant iron producer planned to patch badly worn areas of the in-wall of a furnace, hoping to get at least two more months of service from the stack before it was relined. The monolithic lining lasted 22 months.

In another furnace, castables were used to repair worn bricks from the mantle upward. When business conditions caused the furnace to be shut down almost three years later, it had produced almost 700,000 tons of iron.

• Several steel plants have used the castable materials for lining maintenance in the last ten years.

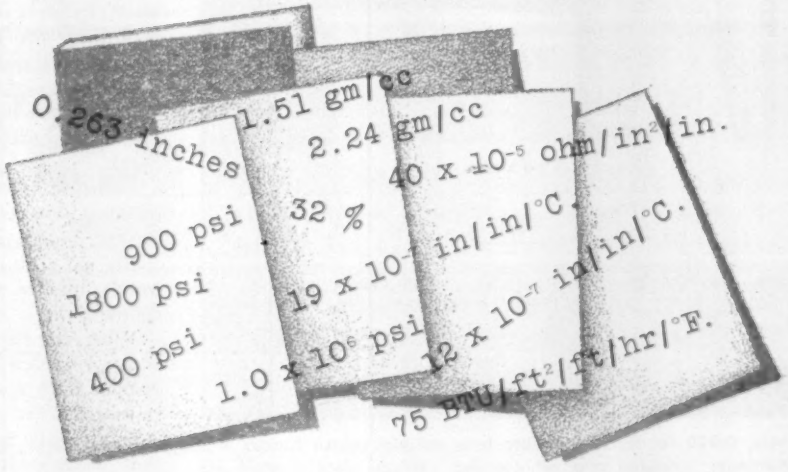
By mid-1960, the company had completed 11 major monolithic installations in blast furnaces. In one of them, about 268 tons of castable material were applied from the mantle upward in the stack, including the stock line wear plate area.



Experts recommend low iron, extra strength castables in the stack, superduty gun clay or high alumina material in the bosh, and high alumina refractories in the hearth zone

NEW TECHNICAL DATA SHEETS AVAILABLE TO GLC ELECTRODE USERS

Recently issued data sheets prepared by our Technical Department contain important information about graphite electrode properties.



Among the typical physical properties detailed for electrodes in various grades and sizes are maximum particle size... apparent and real density... porosity... resistivity... rupture... compressive and tensile strength... elasticity... thermal expansion and conductivity.

Typical chemical properties of the electrode grades show percentages of ash, sulfur, silicon, iron, calcium, aluminum, vanadium and other impurities.

We shall be happy to furnish a set of these electrode technical data sheets, with our compliments, to electric steel furnace operators everywhere. Your request will be most welcome.

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18 EAST 48TH STREET, NEW YORK 17, N. Y.

Adapter Turns Presses Into Stretch Formers

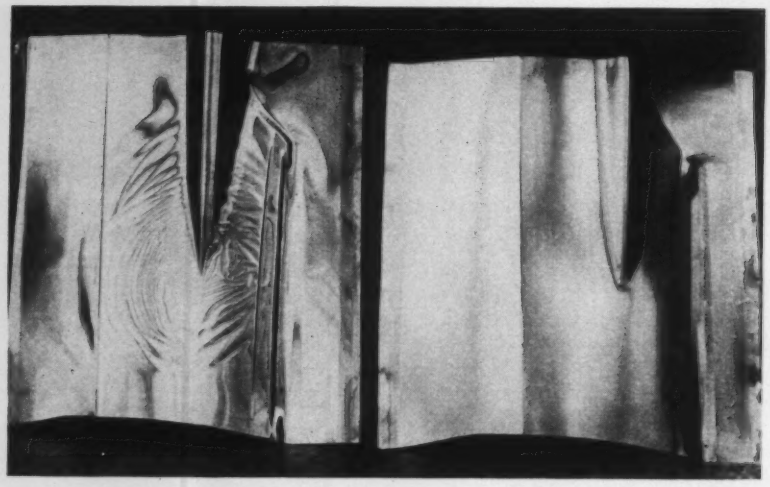
Automakers show interest in device designed for shallow draws. Four principal advantages are listed

STRETCH FORMERS in standard draw presses may save automakers up to 60 cents a car.

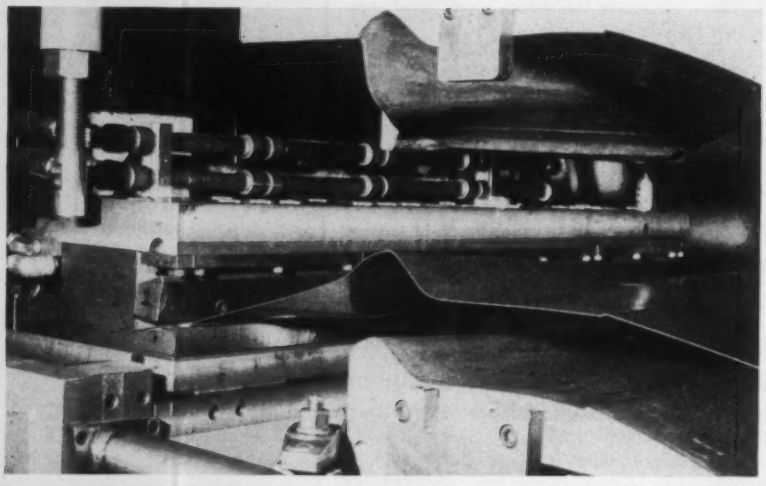
That's what Cyril Bath Co. claims its new attachment can do for operations involving shallow draws. Typical applications: Roof and door panels, decks, and hoods for autos.

The Solon, Ohio, firm lists these advantages for the device:

- Tooling costs are slashed because no draw ring is involved.
- Tension system eliminates need for lubrication.
- Uniform cold working permits use of lighter metal.
- Gripping method reduces trim scrap.



Stainless door panels, 0.020 in. thick, illustrate how quickly stretch former can be adjusted to eliminate wrinkles and oil canning. Pieces were formed 10 minutes apart



Close-up of gripper jaws with formed door panel in place. Note that die has no draw ring. Parts are gripped on two sides instead of four, greatly reducing trim scrap

• The stretch forming attachment grips blanks on two sides, stretches them just before male and female dies mate to form the metal.

A standard press bed holds the stretch forming attachment. Opposed gripper jaws are tied to hydraulic cylinders. Upper and lower die halves operate between the heads.

When sheet metal is fed into the press, the stretcher jaws close on the steel. They grip harder as pressure and tension increase.

As soon as the metal is clamped, the gripper heads and jaws slide apart 1/32 to 3/32 in., depending on the metal. The die punch then starts its downstroke. As the part is formed, the gripper heads move in automatically to compensate for draw depth and prevent tearing. Relief valves are adjustable to regulate backoff and maintain tension on the blank.

Such an approach eliminates oil canning, claims Cyril Bath. Parts formed under such tension have virtually no springback. Stretching is evenly divided on both sides of a center mark.

When the die bottoms, it actuates a drum switch which releases the gripper jaws and returns the press ram for the next stroke.

Cyril Bath engineers point out that adjustments are easily made. Dies can be spotted off the production lines. Simple relief valve adjustments control tension to fit the various drawing qualities of steel sheets.

• The company expects the stretch forming attachment to be adopted for regular production as well as prototype work.

The Solon firm says automen have shown interest. Their figures indicate that savings up to 20 per cent in metal are possible if you use lighter stock and eliminate much of the hold-down flange necessary in conventional forming dies.

The unit, Bath states, works equally well with other metals.

The first model of the metal forming unit was tried out recently in Detroit, where work for adapting the stretch former was done.

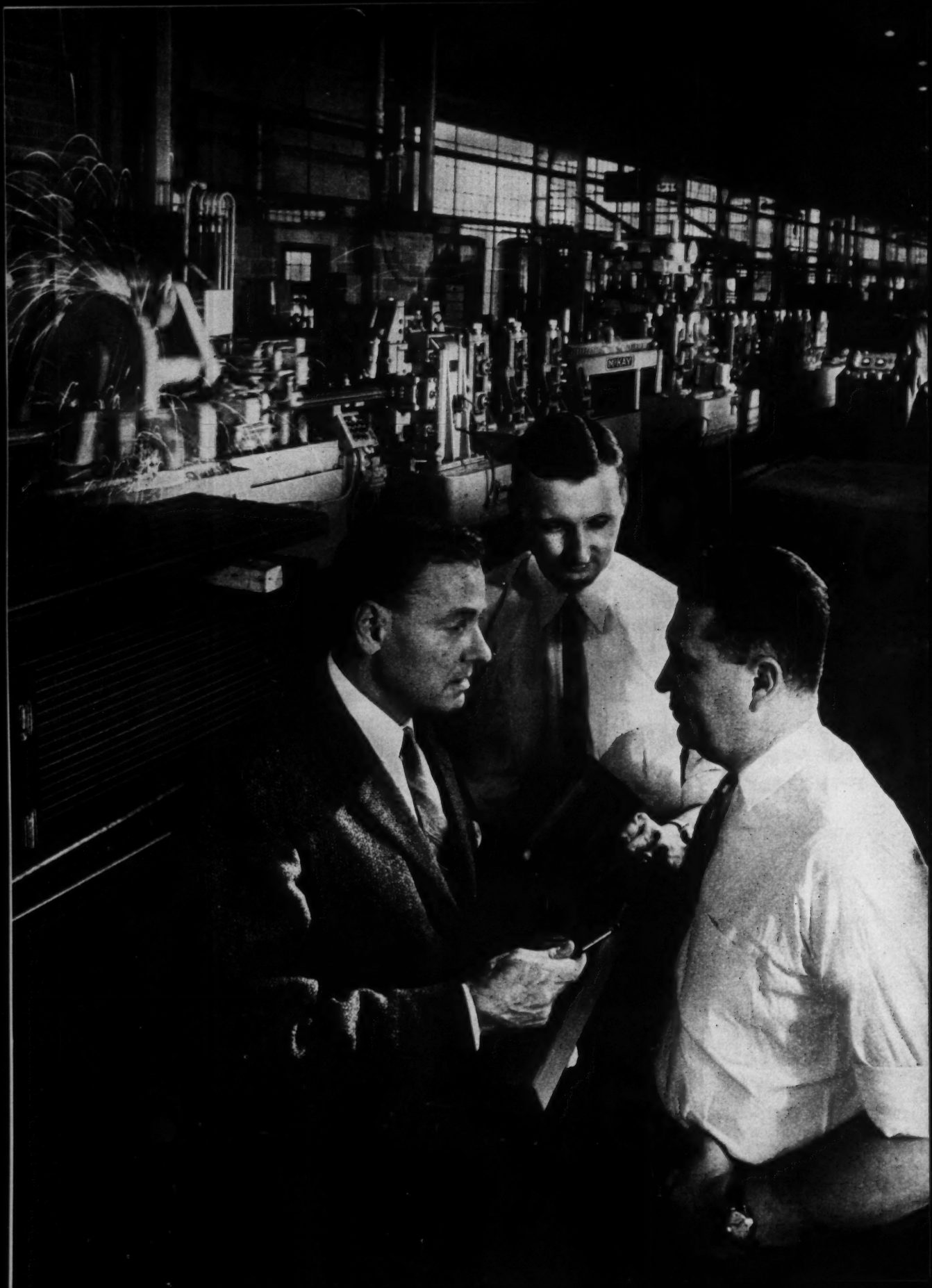
in 1960...

LOOK TO

McKAY MACHINE

FOR PROGRESS IN METAL PROCESSING

FOR EXAMPLE—McKay Pipe and Tube Mills are recognized to be the best conceived and finest constructed machines of their kind. On the next two pages H. Newton Walker, President of Walker Brothers, Conshohocken, Pa., gives a typical user reaction.



How McKay Tube Mills give Walker Brothers a competitive edge

"Our new McKay 5" Tube Mill enables us to extend our production range to the larger sizes of Walkerduct and steel tubing. The mill affords close manufacturing tolerances and improved control over production schedules," says H. Newton Walker, President of Walker Brothers, Conshohocken, Pa.

High Quality Product—Walker Brothers has been a primary supplier of high quality electrical distribution materials to the commercial and industrial construction industry for fifty years. "Walker of Conshohocken" products include building wire, power and control cables, mechanical steel tubing, steel electrical metallic tubing, rigid steel conduit and underfloor raceways.

"This is the third McKay Tube Mill we have installed since 1951 to increase our capacity to manufacture conduit and raceways," continues Mr. Walker. "Each of these mills," he says, "has turned out a product consistent with our high standards of manufacture."

Better Production Economies—Walker Brothers has, in addition to the new McKay 5" Tube Mill, two 3"-capacity McKay mills equipped with strip looping and welding equipment. These mills are generally used to produce ½" through 2" thin wall conduit on a continuous basis at a speed of 150 feet per minute. The new 5" mill also operates at 150 F.P.M. and at that speed can easily produce Walker's line of 6.5" x 1.5" x .076" rectangular raceway.

Mr. Walter Cubberley, Vice President, Production, states: "We have been most satisfied with the performance of this equipment. Performance of the McKay mill has more than met our expectations regarding versatility and cost savings."

Low Maintenance Cost—"There's something to be said for the design of this equipment, too," he says, "in that maintenance is, and has been, satisfactorily low regardless of the age of the machinery."

"This is very solid equipment, including the welder. In fact, I would say these are the best mills we could have selected for our type of operation," Mr. Cubberley concludes.

McKay Machine designs and builds electricweld tube mills for high speed production of ferrous and nonferrous welded tubing up to 20" in diameter. The experience of nearly 25 years of pioneering in the design of tube making equipment is behind each modern McKay Tube Mill.

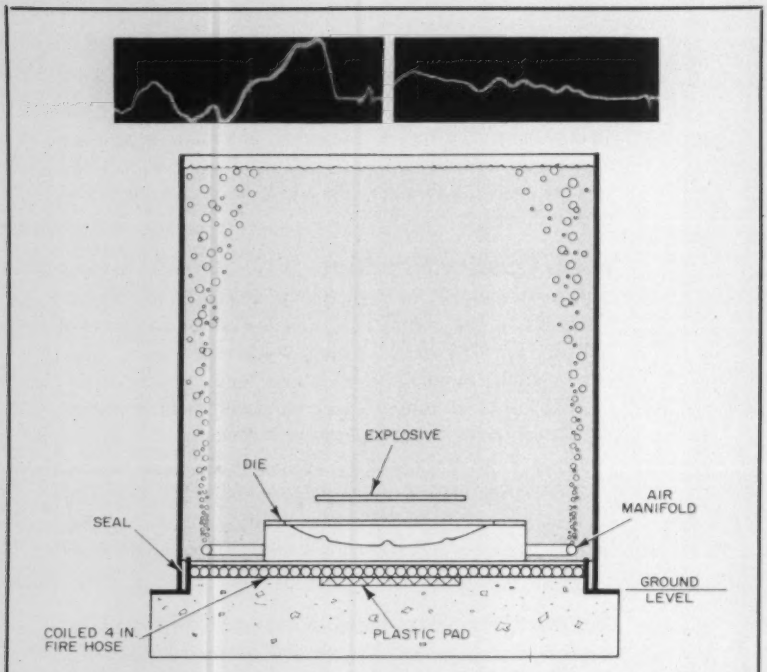
Write for literature, or send a description of your needs for prompt quotation to McKay Machine Company, Youngstown 1, Ohio.

Photo by Arnold Newman shows H. Newton Walker, President of Walker Brothers, speaking with Walter A. Cubberley (R.), Vice President, Production, and McKay sales engineer, Edward M. Lyden, about the high quality product Walker's new McKay 5" Tube Mill is producing.

LOOK TO

McKAY McK MACHINE

FOR PROGRESS IN METAL PROCESSING



Cross section illustrates construction essentials of the Lockheed bubble curtain. Graphs (top) record transient explosion stresses on tank walls with (left) and without air curtain

'Bubble' Tank Cuts Costs At Explosive Forming Plant

LOOKING for a way to cut construction costs of an explosive forming installation?

Engineers at Lockheed Aircraft Corp., Burbank, Calif., have found a way to safely install large forming tanks above ground, eliminating the need for deep pits or mountainous cast containers.

The secret: A curtain of compressed air bubbles inside the walls of the forming tank. It cuts the pressure from an underwater explosion five to six times. Hoop stresses on a test unit, for example, were cut from 24,000 to 4000 psi.

• Tank construction permits wall movement during forming.

Lockheed's explosive forming tank is 13 ft in diameter, 13 ft deep, with walls 0.5 in. thick. Walls are separated from the base with a cast Thiokol filler strip that is thick enough to hold the expansion and contraction of the walls during firing. The base rests on a pad made of a coiled fire hose filled with compressed air.

Source of the bubble curtain is an aerator—a simple doughnut of 3½ in. pipe placed near the bottom. Holes are drilled on 2 in. centers.

Air pressure is regulated to admit 300 cu ft a minute. At that volume, about 2.5 cu ft per minute insulates each circumferential foot of the tank wall from the effects of the explosive pressure wave.

Lockheed has made no changes in its standard tools for research on explosive forming. Dies of cast steel, iron, and Kirksite are employed. Materials being formed include: AM350, Vascojet 1000, 6 Al-4V and 8 Mn titanium.

Seamed Copper Tube Made Electronically

ELECTRONICALLY welded copper tubing is being produced commercially at Tubotron Inc., Newark, N. J., an affiliate of Eastern Rolling Mills Inc.

Pilot runs by an independent testing laboratory show the tubing will withstand more than 2000 psi of hydrostatic pressure.

Areas of application: Heat exchanger equipment, missile and aircraft, chemical processing, and plumbing.

Available in outside diameters of ½ to 3½ in. and wall thicknesses of 0.017 to 0.140 in., the tubing is said to be produced to extremely close tolerances.

• Process Patented—Strip copper is passed through a forming mill and guided through a series of graduated rollers to form an almost complete circle. The open faces of the rounded strip are then brought into a plastic state through contact with the electrodes of the patented Thermatool unit.

Preheating takes place as the strip passes from the Thermatool contacts to a point between squeeze rolls where the weld is made.

The high frequency current follows a V-path, flowing from one contact along one open face of the strip to the weld point, and then along the other metal face to the opposite contact.

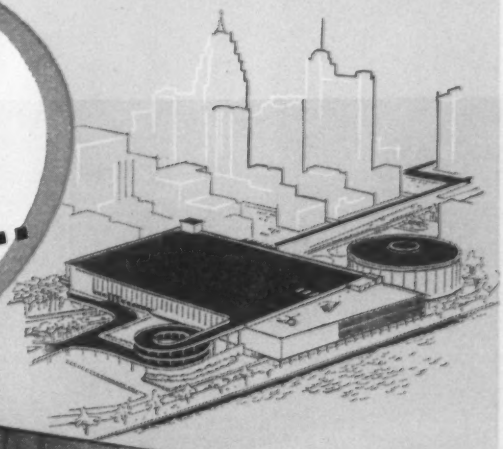
Because the current depth never exceeds 0.007 in. from the face of the strip and concentrates on a small surface area, it is able to heat the weld faces to a plastic state in a short time. For example, if the production line is running copper at a rate of 300 fpm, the weld surfaces of the cold strip must be heated to 1700° F in 1/60th of a second.

Have you entered the Usership Contest?

See the Servicenter, Pages 5 and 6.

11 SQUARE D SUBSTATIONS SERVE COBO HALL...

World's largest exhibition building, COBO HALL occupies 10 acres of Detroit's Civic Center



...capable of supplying 22,000 KVA of continuous power!

Square D Field Engineer Don Selby (*right*) and Mr. Gil Brandt, Project Electrical Engineer of Giffels and Rossetti, architect for COBO HALL, examining one of the drawout circuit breakers in the low voltage secondary portion of a Square D 2000 KVA double-ended unit substation equipped with nitrogen-filled transformers

Easy, fast installation was a prime objective when eleven Square D unit substations went into COBO HALL. The various sections of each substation were completely coordinated at the factory. Reconnection of those sections at the job site required a minimum of time and labor.

Design leadership is very much in evidence in Square D's broad line of unit substations. We suggest a three-point comparison to prove the point—ease of installation, minimum maintenance, maximum safety for both equipment and personnel.

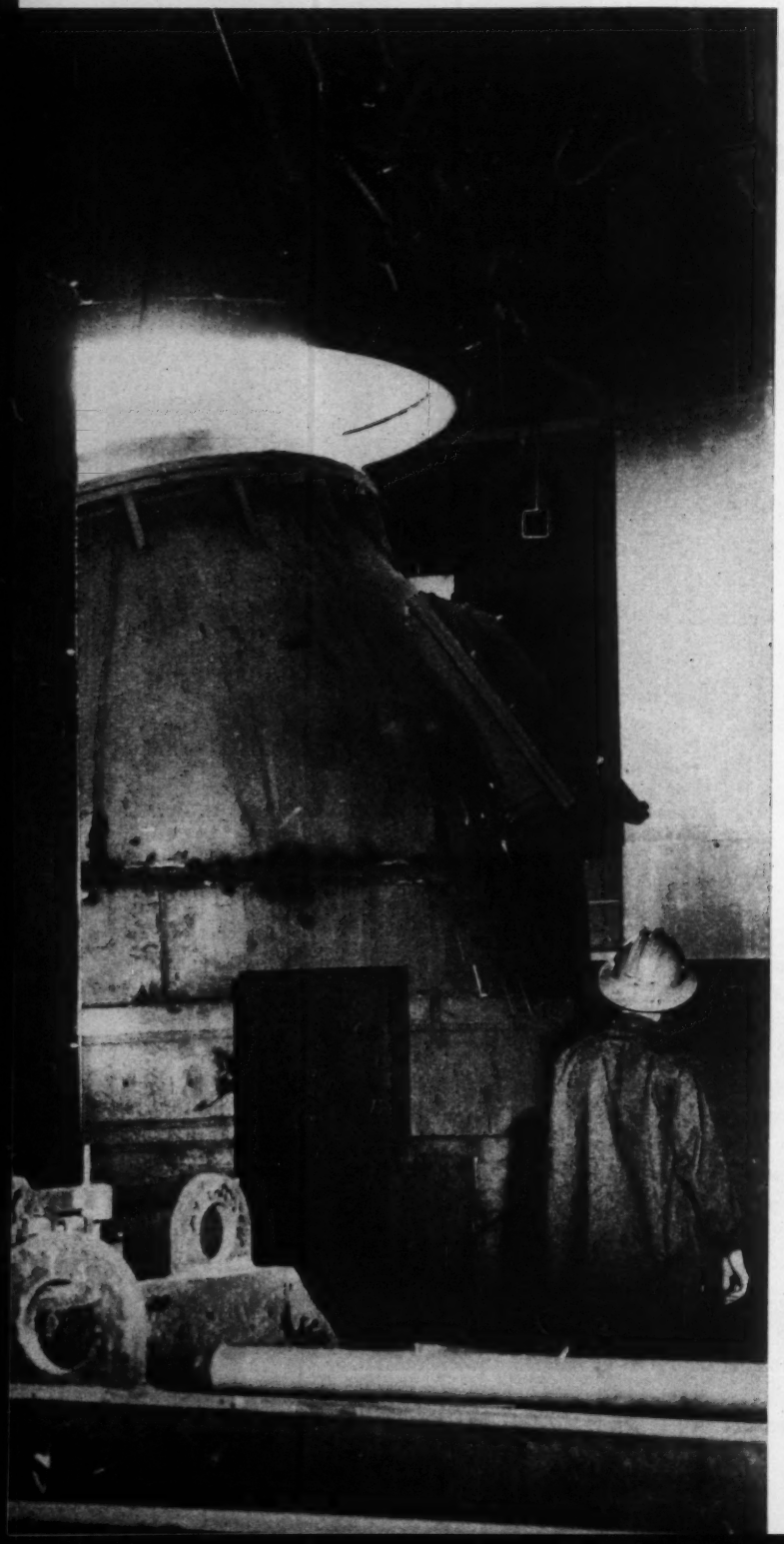
AMONG OTHER SQUARE D EQUIPMENT IN COBO HALL

31 Control Centers
28 Switchboards
450 Panelboards
75 Contactor Panels
1 Dimmer Board
10 Dimmer Panels
16 NEMA 4-Circuit Interrupters
120 Spotlight Control Panels
19,000 feet of Lay-In Duct

SQUARE D COMPANY

wherever electricity is distributed and controlled

These Hints May Help You Select



EXHAUST GASES from oxygen converters at the Riverdale, Ill., plant of Acme Steel Co. are cleaned by electrostatic precipitators. But the type and volume of fumes from other steel plants or metallurgical processes may make an entirely different dust collection system desirable.

Selection of a system for a given application is a critical factor, say engineers at Western Precipitation Div. (Los Angeles) of Joy Mfg. Corp., which offers a complete line of dust collection equipment.

• **Cleaning systems in metallurgical applications may include centrifugal collectors, bag filters, wet collectors, and electrostatic precipitators.**

The centrifugal units separate dust from the gas stream by putting the gases in rotary motion. They may be large diameter, cyclone units, or the more common, multiple cyclone type. Many of the high efficiency cyclones are of the multiunit design. They are relatively inexpensive and require little or no maintenance.

Centrifugal collectors are said to be most satisfactory on particles 10 microns or more in diameter. As particle size increases, efficiency drops sharply.

Bag filters usually incorporate a woven cloth or felted material. Accumulation of solid particles on the surface of the filter forms a filter cake that is dislodged periodically by shaking, reverse air flow, or other means. Cloth and felted fabric bags are said to be limited to temperatures below 180° F. Orlon and Dacron can take temperatures up to 280° F. Glass fiber filters are said to be usable up to 500° F.

Baghouse installations, especially those using glass bags, have been gaining popularity with electric furnace steelmakers.

a Gas Cleaning System

Wet collectors bring dust filled gases in contact with a water film or spray. Some of them employ cyclones or centrifuges; some use high pressure drop venturis; and others involve multiple sprays. Capital cost of the collectors is said to be modest, and the units are effective in areas that have plenty of water and present no problem in disposal of runoff.

• Electrical precipitators employ high voltage electric charges to collect suspended materials.

The units ordinarily consist of a series of parallel, flat, grounded plates, about 9 in. apart, which form ducts to carry the gas stream. A series of fine wires, mounted in the center of the ducts and insulated from the plates, forms the discharge electrode system.

The precipitator energizing system usually includes a high voltage transformer and a rectifier that converts line voltage, alternating current to a pulsating, direct current. Ionization in the vicinity of the discharge electrode is transmitted to the particles of dust, and they migrate to grounded plates, which are shaken mechanically from time to time, so that dust will drop into hoppers under the unit, away from the gas stream. Efficiencies up to 99.9 per cent are claimed for the electrostatic units.

• Important factor in collector design: Collection capacity to meet local regulations or material recovery goals.

In some applications, antipollution equipment offers recovery of valuable materials which would justify purchase of the most efficient collection system; where pollution control is the only requirement, operators are inclined to use the equipment that does a satisfactory job at relatively low cost.

The attitude of the local government is also important in the selection of antipollution systems. Example: Plants in Pittsburgh and surrounding Allegheny County were placed under the same stiff air pollution ordinance recently. The law sets up limits on effluents from industrial furnaces—they vary by furnace type.

• In some cases, the same system may be used to collect dust discharged from different metallurgical operations.

Example: Dust and fumes from L-D facilities at the Cleveland Works of Jones & Laughlin Steel Corp. will be collected by a $5 million gas cleaning station that will also police gases from three open hearths. The system, to be installed by Western Precipitation, will make for lower capital costs. But it is expected to offer the same efficiency obtainable from separate units for the two furnace areas.

Gases from the open hearths will pass through waste heat boilers for cooling and into a main flue system for combination with gases from the oxygen furnaces. Then the gases will go through a central gas cleaning station consisting of eight, dry plate, electrostatic units.

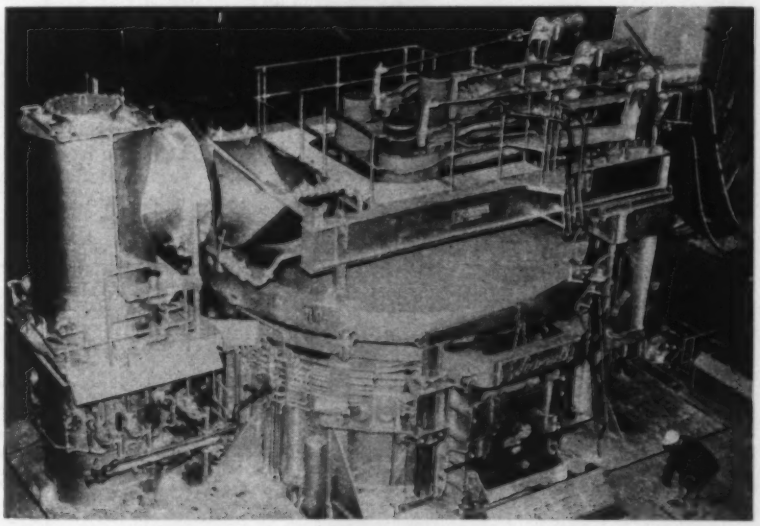
• Other installations will incorporate two or more gas cleaning devices in systems serving a single plant or process.

Top gases from a typical pig iron blast furnace pass through a cyclone type dust catcher, where the largest particles are removed. Then they go through wet scrubbers for further reduction of dust and fume content. Finally, the gases are passed through a wet type, electrostatic precipitator.

Gases from ferromanganese furnaces go through a centrifugal type dust catcher, a conditioner that cools them to 400 or 500° F, and a horizontal flow, plate type precipitator.

Iron ore sintering plants often include electrostatic precipitators, which treat exhaust gases at temperatures above 300° F. The units are said to offer removal efficiencies up to 90 per cent.

In some plants, mechanical collectors are used with the precipitators.



Hot gases from this electric steelmaking furnace pass through a collection hood and into a baghouse that contains high temperature, Fibreglas filters

For parts like these . . .
barrel-finishing
is best finishing

. . . with TUMBLEX* "S"

Barrel-finishing not only gives parts the best finish — it's the fastest, easiest way to cut your finishing costs-per-piece.

To make sure of this, combine the right barrel-finishing techniques with the right abrasives. And to make sure of the right abrasives choose from the complete Norton line, which covers the entire range of barrel-finishing.

If your metal parts have hard-to-get-at areas — like any of those shown — Norton TUMBLEX "S" abrasives are your best choice. These spheres of bonded ALUNDUM* abrasive roll around and through intricate parts giving high quality and uniformity of surface finish.

Made in 5 sizes, TUMBLEX "S" spheres are made to extremely close diameter tolerances — and they wear down so slowly and evenly they can be used over and over for the same top quality finishing.

Norton TUMBLEX abrasives are all immediately available from stock. Order your selection or send sample unfinished parts to our Sample Processing Department. We'll barrel-finish samples with TUMBLEX "S" or with any other Norton TUMBLEX abrasive, if more suitable. Our report will bring you complete details on how to get the best results. NORTON COMPANY, General Offices, Worcester 6, Mass. Plants and distributors around the world.

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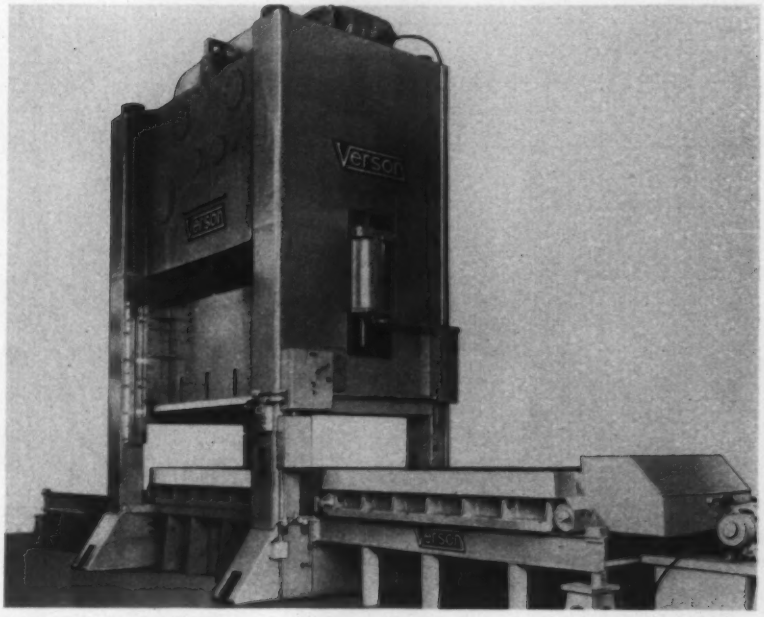
Moving Bolster Speeds Die Changes

A SIMPLIFIED, moving bolster assembly speeds die changes and is said to cost less than previous styles.

The press bolster is mounted on a wheeled traction unit which moves on rails from a table on either side of the press. The drive unit has a direct current motor and a gear reducer which slows the bolster as it approaches positive stops. Hydraulic cylinders raise or lower the bolster in the press bed.

When double units are employed, extension tables are placed on both sides of the press. Two traction units with bolsters are connected in tandem. When one bolster is in pressing position, the other one is on the extension table where tooling can be changed or adjusted while the press is working the other bolster.

For further information, *write* Verson Allsteel Press Co., 9300 S. Kenwood Ave., Chicago 19, Ill.



Press Briquets 9 Tons of Chips per Hour

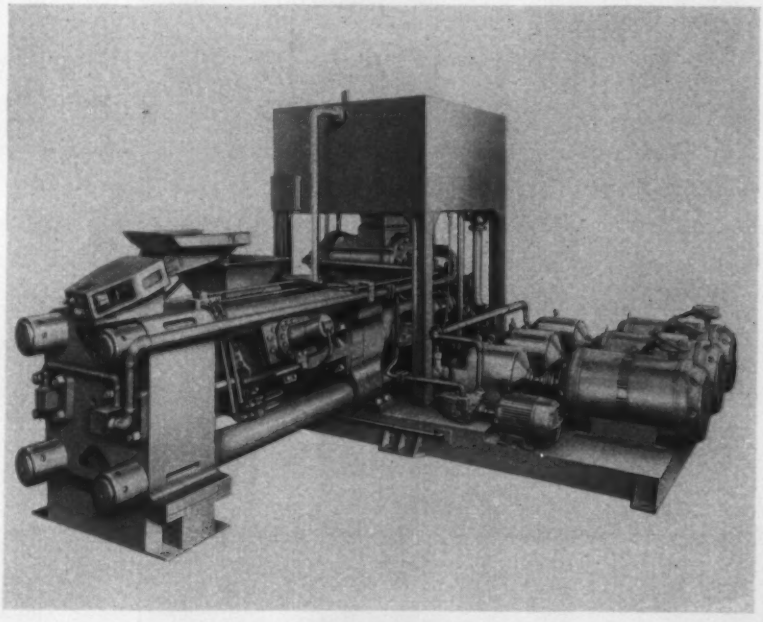
NINE TONS of chips are formed into dense briquets in an hour by this new, outsize press. Briquets made of machine scrap are 80 per cent dense and weigh 30 to 40 lb each.

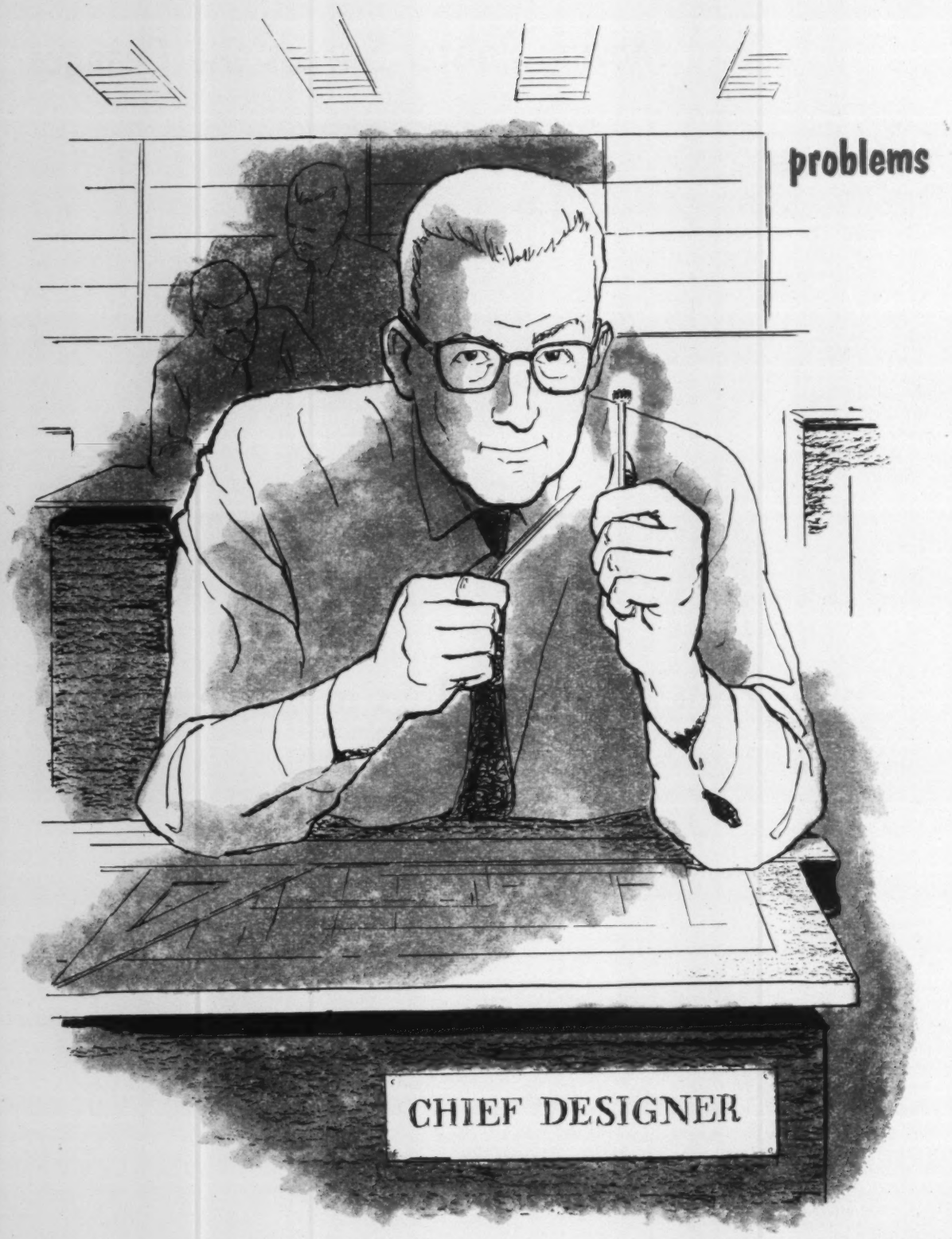
They can be charged directly into a cupola.

The largest of six similar units, the press is fully automatic. Moving parts are pressure lubricated from the operating fluid system. Cylinder pressure plates and die holders are made of cast steel. Piston rods are chrome nickel, hardened and ground. The electrical system is completely enclosed.

Power is furnished by three, 125 hp motors.

Increasing quantities of machine scrap being produced by more efficient machine tools create problems of scrap handling and storage, as well as contamination. Briqueting




problems
CHIEF DESIGNER

"Miniaturization makes power transmission extra-tough . . . but G.S. Precision Gearing specialists can give us a big head-start on our new designs."

"For years we've brought in G.S. Precision Gearing experts at beginning stages of design jobs—and it has paid off, whether in modifying existing products or breaking trail in radically new directions. Miniaturization has given us even tougher Precision Gearing problems—but G.S. is still saving us all kinds of grief by leading us to practical power transmission methods early in the game.

"G.S. makes the full range of Small and Intermediate Gearing: Spurs, Spiral, Bevels, Helicals, Internals, Zerols, Clusters, Ratchets, Splines, Hobbing, Worm Gearing. That means they're free to prescribe the *right* kind of Gearing—and then turn around and *produce* it right, run after run (as our production people will tell you).

"I guess it all boils down to this: We want top quality, so we deal with top sources—and G.S. is known all over the country (among both big and little companies) as *the* source of precision-made Small and Intermediate Gearing in production quantities—which, of course, means production economies. And there's one other thing that means a lot to all of us—their men are mighty nice guys to work with! I'd recommend that you put them on *your* design team when you come up against a Precision Gearing problem."

YOU'LL FIND G.S. GEARING IN TOP QUALITY PRODUCTS LIKE THESE . . .

Adding Machines • Aircraft Carburetors & Fuel Metering Systems • Aircraft Instruments and Radios • Automatic Musical Instruments • Automation Systems • Business Machines • Check Signing & Protecting Machines • Clippers for Barbers, Animal Shearing & Hedge Trimming • Cloth Cutting Machines • Coin Changers & Counters • Communication Equipment • Control Mechanisms • Electric Fans • Electric Motors • Floor Polishers, Sanders, Scrubbers, Sweepers • Food & Drink Mixers, Blenders • Home Appliances • Lawn Sprinklers • Machine Tools • Meat Tenderizers, Grinders, Slicers • Military Equipment • Motion Picture Cameras & Projectors • Optical Instruments • Outboard Motors • Pneumatic Production Tools • Radio & Radar Tuning Assemblies • Radio Anti-backlash Gears • Range Finders • Record Changers • Sewing Machines • Steel Strap Stretchers • Step Switches • Tapping, Drilling & Threading Equipment • Telephone Dials • Television Sets • Thermostatic Controls • Typewriters • Vending Machines • Washing Machines.

SEND FOR G.S. *illustrated folder! See where and how we mass-manufacture Small Gearing to uniformly fine tolerances. Folder contains 23 pictures of Small Gears, plant view, as well as Diametral and Circular Pitch Tables. Ask for your copy on company stationery, please!*

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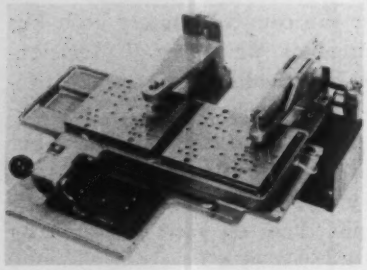
44 Years of Specializing in Small Gearing!

helps solve such problems, making it easier to justify press cost.

For further information, *write* Milwaukee Foundry Equipment Div., SPO Inc., 6494 W. Bruce St., Milwaukee, Wis.

Rapid Positioning Table Eliminates Fixtures, Jigs

JIGS and fixtures for work such as precision drilling, reaming, and tapping operations can be eliminated when the Burgmaster positioning table is used on any of the three Burgmaster, six spindle, turret drilling machines. The table working area is 4 x 5 in. and positioning accuracy is ±0.0005 in.



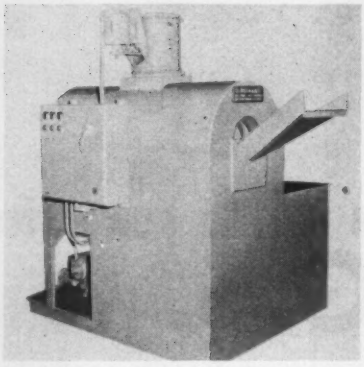
Ball bearing mounting permits rapid positioning with minimum effort. Where accuracy requires bushings, an optional outboard support bracket (with its own bushing liner) eliminates a fixture.

For further information, *write* Burgmaster Corp., 15001 S. Figueroa St., Gardena, Calif.

Three Section Unit Cleans Small Parts by Tumbling

ABOUT 6 to 9 cu ft of small stampings, castings, and machined parts can be cleaned per hour in a drum type unit made by a Cincinnati firm.

Operation: Parts are loaded into the machine manually from shop containers or direct from a conveyor discharging into the loading hopper. A worm inside the drum conveys the parts through the machine. They're tumbled through soak, spray, and drain sections before being automatically discharged. Time



in the various sections is controlled by the variable speed drive.

Included in the self-contained unit is a cleaning solution pump and motor, variable speed drive and motor, ventilating blower and motor, solution temperature controls, and a solution tank with an access door to solution filtering screens. The solution tank can be heated by steam, gas, or electricity. Motor controls are mounted in a single enclosure with an interlocked disconnect switch.

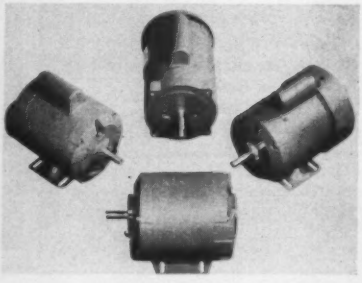
Similar machines can be provided for large parts. They can also be ordered with additional cleaning, rinse, or drying sections.

For further information, *write* Cincinnati Cleaning & Finishing Machinery Co., 2019 Hageman St., Cincinnati 41, Ohio.

Eight Sizes Available in Fractional Motor Line

FRACTIONAL horsepower, ac motors in the Duty Master line are available in 1/20, 1/12, 1/8, 1/6, 1/4, 1/3, 1/2 and 3/4 hp ratings.

Capacitor start, split phase, and polyphase units are made in frame sizes 48 and 56. Repulsion start, induction run models come in frame size 56. You can specify open protected; totally enclosed, fan cooled; totally enclosed, nonventilated; or



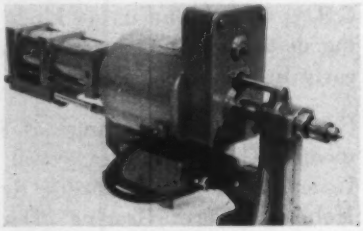
explosion proof enclosures.

You have a choice of ball or sleeve bearings. Ball bearings are double shielded and permanently lubricated to keep out contaminants. Sleeve bearings are packed with Permawick, a patented fluid fiber material that soaks up and combines with oil. Sleeve bearing motors may be mounted vertically or horizonally with moderate end thrusts.

For further information, *write* Reliance Electric & Engineering Co., 24701 Euclid Ave., Cleveland 17, Ohio.

Small Hole Drilling Unit Has 1/4 in. Chuck Capacity

A SMALL hole drilling machine (Model 113-3½) has a 3½ in. stroke. An electric motor drives the spindle. The air feed has hydraulic control.



Seven sets of timing belts and pulleys provide spindle speeds from 750 to 15,800 rpm. Chuck capacity is 1/4 in.

For further information, *write* Electro-Mechano Co., 241 E. Erie St., Milwaukee, Wis.

Valve Controls Air, Oil, Even Grinding Slurries

AIR, oil, chemicals, and grinding slurries can be controlled by the Tube-O-Matic valve. No poppets, spools, metal to metal contacts, or metal to rubber seals are used. The valve is suitable for handling problems with contaminated fluids and gases.

When the valve is open, supply pressure (through the inlet port), forces an elastic rubber sleeve against the tube, forcing the media to flow around the inlet plug and through the outlet port.

To close the valve, pilot pressure is applied between the inside di-

LOWER YOUR FINISHING COSTS with WALLINGFORD

Bright Annealed Stainless Steel Strip

Conventional steel making is inadequate when you require decorative stainless steel strip with an extra bright finish to pass rigid corrosion tests. "Bright Annealing" is the answer – and Wallingford is the first steel maker to apply this process to its regular production of stainless strip!

How does "Bright Annealing" lower finishing costs? By preventing formation of oxide scales present after conventional annealing and by eliminating the need for further processing which often dulls the finish. Preservation of the bright surface produced by highly polished rolls results in a finish so excellent that users find that buffing time is greatly reduced, affording significant savings.

Superiority in facilities, research and skill enables Wallingford to produce "tonnage on a laboratory basis" and make quality strip available economically.

SEE NEXT PAGE FOR MORE INFORMATION ON BRIGHT ANNEALED STAINLESS STEELS

THE WALLINGFORD STEEL CO.

WALLINGFORD, CONNECTICUT, U.S.A.

COLD ROLLED STRIP: Super Metals, Stainless, Alloy
WELDED TUBES AND PIPE: Super Metals, Stainless, Alloy

COMPLETE AND MAIL REPLY POST CARD TO RECEIVE YOUR COPY OF OUR NEW FOLDER ON STAINLESS STEEL STRIP, "TONNAGE ON A LABORATORY BASIS"

☐ Please send me your "Tonnage On A Laboratory Basis" Folder (Form No. G-1333).

☐ Have your representative call to discuss my finishing requirements.

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Firm _____

Street _____

City _____ Zone _____ State _____

JUST COMPLETE ABOVE AND MAIL — NO ADDRESSING OR POSTAGE REQUIRED

WALLINGFORD

Bright Annealed Stainless Steel Strip

Stainless steel derives its resistance to corrosion from the presence of chromium, so any depletion of chromium during processing must be avoided.

Because of Wallingford's success in this area, Wallingford Stainless Steel passes even the most rigid corrosion tests set up by leading manufacturers. Exceptional corrosion resistance is of prime importance when the stainless steel is to be used for decorative purposes and may be exposed to weather, salt water, or other corrosive elements.

In producing this stainless steel strip, Wallingford employs bright annealing. Result? Reduced customer buffing costs PLUS corrosion resistance and a bright finish never before attained!

Whether your problem is brightness of finish or the degree of corrosion resistance, Wallingford can supply stainless steel strip that will satisfy.

> Widths from 0.150" to 27". Thicknesses down to .0005". Extremely close tolerances are maintained.

COMPLETE REVERSE SIDE OF REPLY CARD BELOW AND MAIL TO RECEIVE NEW STAINLESS STEEL STRIP FOLDER, "TONNAGE ON A LABORATORY BASIS"

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Wallingford, Connecticut

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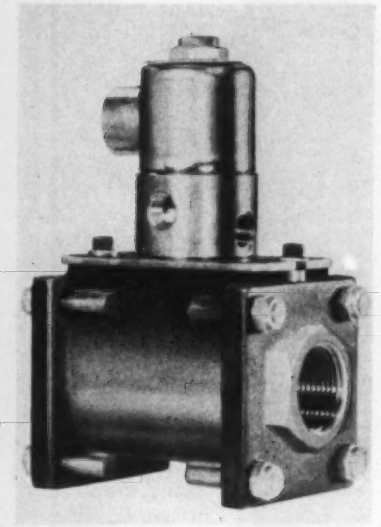
NEW PRODUCTS and equipment



ameter of the tube and the outer periphery of the rubber sleeve. That collapses the sleeve over the rounded ends of the inlet and outlet end plugs, sealing off the supply pressure. The only action is the flexing of the sleeve.

Pressures up to 200 psi can be handled. Pipe sizes: ¼ to 12 in. The valve is available normally open or normally closed.

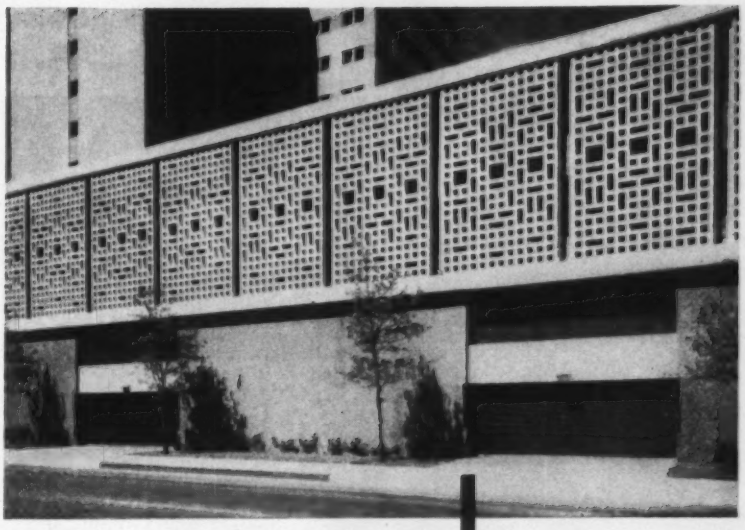
For further information, *write* Airmatic Valve Inc., 7313 Associate Ave., Cleveland 9, Ohio.

Interchangeable Drums Available for Finishers

FINISHING of different part sizes and shapes in Selectro Vibro units is done without marring or distortion, says the maker. They deburr, descale, and finish inside surface and hard to get at areas regardless of size of openings.

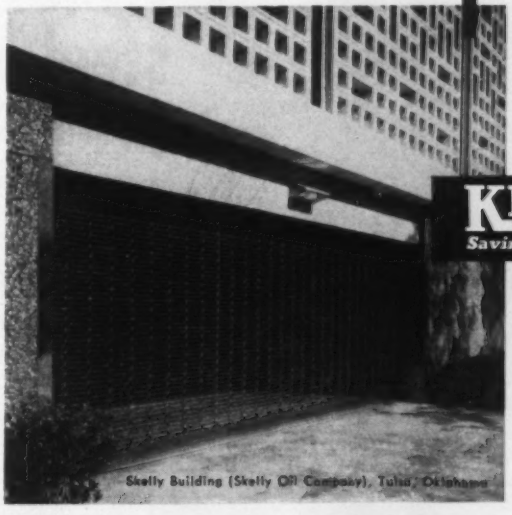
The drums are easily interchangeable and are available in many sizes. Multiple sectional drums for different types of material requiring different media and finishing time in the same operation can be ordered. The eccentric vibrating mechanism has an adjustable stroke.

The manufacturer says the units reduce the finishing time cycle up to one-tenth normal tumbling time and finish nearly twice as many parts per cycle. It adds that rub-



Upward-acting, all-metal grilles that block intrusion when closed, without cutting off light, air or vision . . . coil quickly out of the way above the opening whenever desirable . . . and complement the beauty of today's most distinguished buildings and architectural designs

Kinnear Steel Rolling Grilles



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Built of steel, aluminum or bronze, to fit any doorway or other opening — with motor or manual control — for face-of-wall or under-lintel installation — made by the makers of . . .

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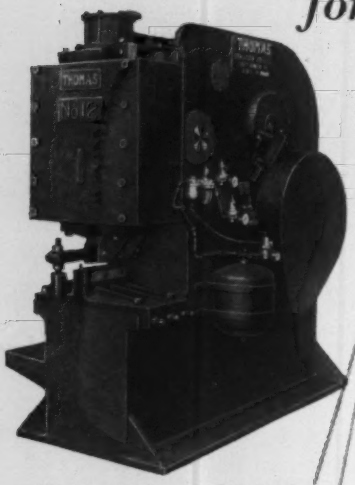

This all-steel Thomas machine is available in capacities of 50 through 600 tons. It can be supplied with tools for shearing flats, rounds or angles, or fitted with punching tools.

• *Machine is shown tooled for flats. Modern Thomas design makes this machine a compact, space-saving, self-contained unit for shearing or punching.*

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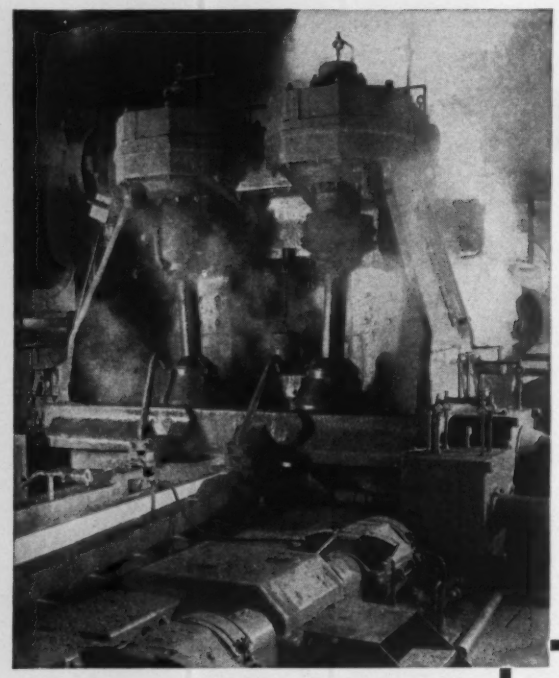
54



Edging hot strip steel

No place for second-best equipment. That's why this heavy-duty vertical overdrive edger uses rugged Cone-Drive **double-enveloping worm** gearing to drive the vertical rolls continuously.

Rugged Cone-Drive gearing is available in gearsets, speed reducers and gearmotors.

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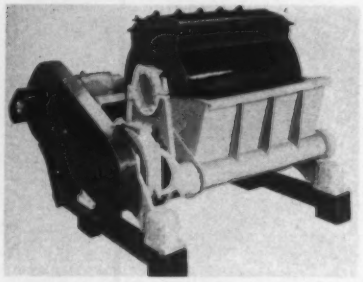

bing action instead of tumbling eliminates distortion in thin parts—no nicking, marring, or scratching. Parts may be dumped loose into the drum with media or fixtured on the drum or outside rack.

For further information, *write* Productive Equipment Corp., 2926 W. Lake St., Chicago 12, Ill.

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A METALLOGRAPHIC device, the Numec cathodic vacuum etcher, can do such things as prepare specimens of radioactive materials and reveal the grain structure of dissimilar metals.

The unit has a power supply, vacuum system, and etching chamber. The etching chamber can handle specimens up to ¾ in. square or 1 in. in diameter with conventional plastic specimen holders, or unmounted cylindrical specimens 1¼ in. in diameter.

For further information, *write* Nuclear Materials & Equipment Corp., Apollo, Pa.

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A 15 LB, AIR operated clutch and motor sheave provides shockless starts without overheating. The unit is self-adjusting, has antifriction bearings, and requires no rotary joint.

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For further information, *write* Horton Mfg. Co. Inc., 1179-15th Ave. S. E., Minneapolis 14, Minn.

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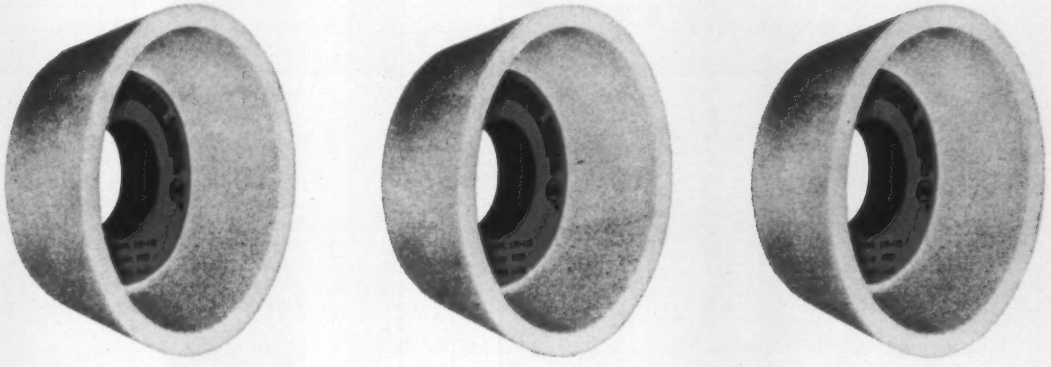

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NEW literature

Write directly to the company for a copy

Stainless Steel Welding

Practical procedures for welding stainless steel and types of electrodes and wire available are covered in a manual. McKay Co., 1005 Liberty Ave., Pittsburgh 22, Pa.

Selective Plating

Problems solved by varied engineering applications of a new high speed, selective plating process are discussed in an eight page booklet. It also lists available equipment, techniques, and results achieved. Selectrons Ltd., 520 Fifth Ave., New York 36, N.Y.

Swaging Information

Basic information about swaging—what can be swaged, metallurgical effects of swaging, selecting swaging equipment, and tooling and feeding swagers—is contained in a 16 page booklet. Fenn Mfg. Co., Fenn Road, Newington, Conn.

Iron Powder Data

"A. W. Iron Powder Technical Data Bulletin No. 2" reports the results of extensive tests on grades of Alan Wood iron powder. Graphs include findings on briqueting pressure, transverse rupture, hardness, and size change. Iron Powder Sales Dept., Alan Wood Steel Co., Conshohocken, Pa.

Annual Retooling Guide

A 28 page report shows how a planned, annual retooling program can increase output of screw driving, grinding, nut running, drilling, and similar production operations. A slide rule computer for rapid calculation of your gross dividend on payroll dollars is included. Ask for Forms 5250A and 5290. Ingersoll-Rand Co., 11 Broadway, New York 4, N. Y.

Pipe Information

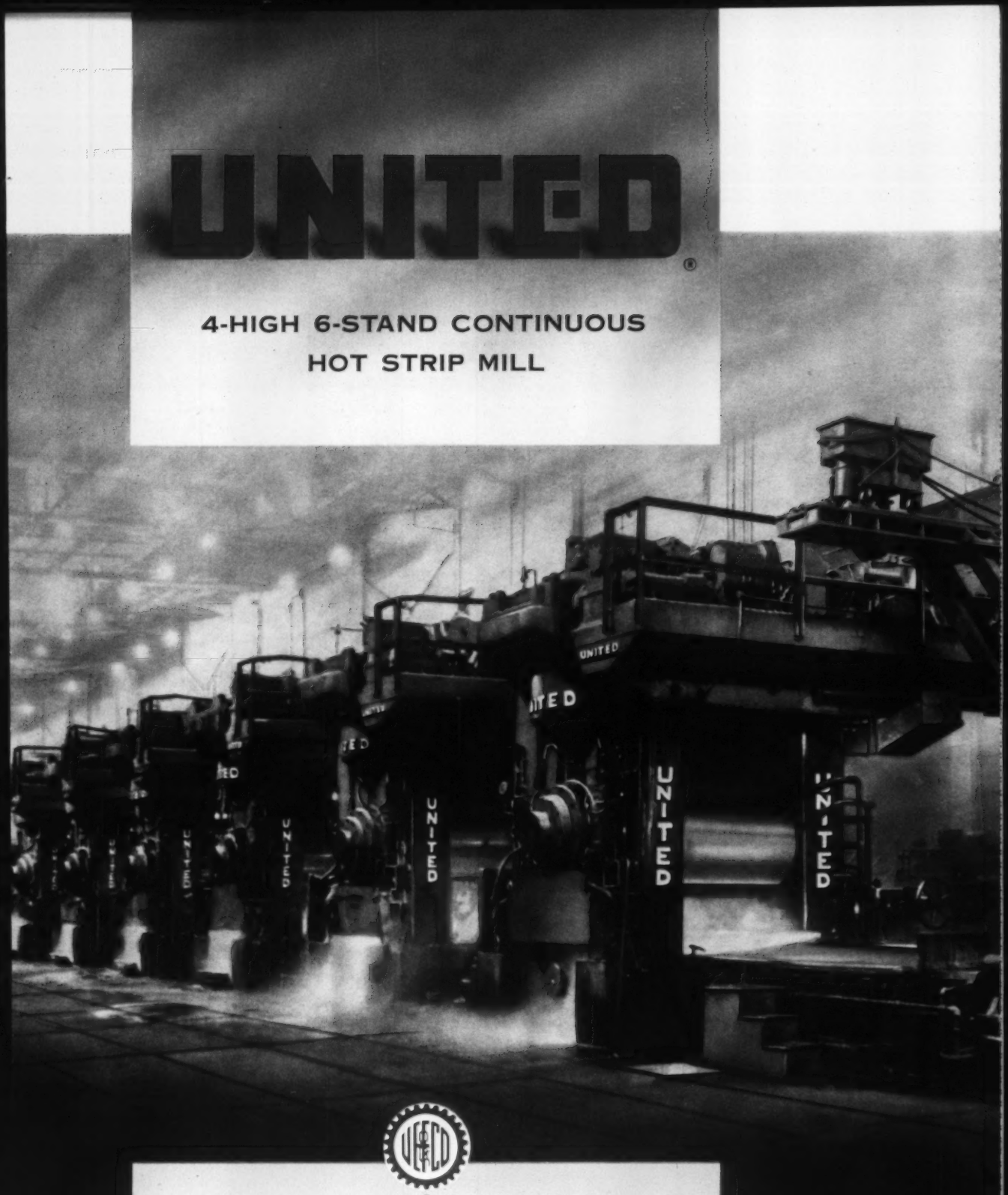
An eight page booklet (FB-502A) covers seamless welding fittings and flanges in carbon, alloy, and stainless steels. Included are charts of standard sizes and schedules according to ASA B36.10 and ASA B36.19. Tubular Products Div., Babcock & Wilcox Co., Beaver Falls, Pa.

Diamond Tool Lathe

A bulletin describes a diamond tool lathe and lists its applications. It includes chapters on surface finish and outlines the various measuring methods. Engineering Dept., Milo Mfg. Co., 259 N. Broad St., Elizabeth, N. J.

Fabricated Welded Steel Tubing

A four page folder (P.O. 6759) describes welded steel tubing available as fabricated or semifabricated items in five different steels. Product Information Service, Armco Steel Corp., Middletown, Ohio.



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Steelmaking Upturn in Doubt

PROSPECTS FOR AN UPTURN in steel demand before the end of the year are fading as automakers reveal that they'll build fewer cars this month and next than they assembled in October.

Production schedules aren't definite yet, but General Motors Corp.'s Fisher Body Div. gave steelmakers an inkling of what's coming when it told a big Midwestern mill that it will buy 25 per cent less steel in December than it bought last month.

If other auto manufacturers follow Fisher Body's lead, you can expect motordom's output to drop from last month's estimated 615,000 units to about 500,000 in November and 450,000 in December. The cutback may be even sharper if there's a drop in new car sales.

AUTO SALES GOOD, BUT—Even though auto dealers sold about as many new domestic cars last month as they've ever delivered in October (more than 500,000), they didn't keep pace with production. Output exceeded sales by almost 100,000 units, boosting dealer inventories to 950,000 (vs. 575,000 a year ago). To prevent the backlog of unsold cars from getting out of hand, automakers are cutting their production back to the sales level.

FEW BRIGHT SPOTS— In the face of slumping automotive demand, steel sales executives see nothing in the market that's likely to take up the slack. Construction and canning are declining seasonally, and there's no evidence of a pickup in machinery or appliance production. But there's at least one source of encouragement: New orders for durable goods (seasonally adjusted) are on the upswing. They rose from $13.8 billion in July to $14.4 billion in August and $14.7 billion in September. Steelmakers may feel the impact of the upward trend in the next two months. It may help to offset the decline in autos.

STEELMEN SKEPTICAL—Joseph L. Block, chairman, Inland Steel Co., in commenting on the outlook for his firm, told stockholders that he no longer expects a significant rise in demand during the fourth quarter. Customers are continuing to adjust their inventories to minimum levels, he said, and sales have fallen short of forecasts in many steel consuming industries. Arthur B. Homer, chairman of Bethlehem Steel Co., believes that his firm's ingot rate will hold near 55 per cent of capacity for the rest of the year.

DISTRIBUTORS DISMAYED— Like their suppliers, service centers see little likelihood of an upturn in sales before the early part of next year. They're hurt because steel consumption is lagging and mills can ship small orders almost as fast as the service centers can. In the East, November shipments are expected to hold at the September-October level. Distributors are absorbing the recent rail rate increases because: 1. Business is too competitive to pass the added costs along. 2. It's too expensive, considering the size of the increases, to set up new price lists. 3. Most shipments are being made by truck.

INGOT RATE SLIPS— Last week, steelmakers operated their furnaces at 51.7 per cent of capacity, 2.5 percentage points below the previous week's revised rate. Production was about 1,473,000 ingot tons, the smallest output in a nonholiday week this year.

SCRAP MARKET BREAKS—Reflecting the fading hopes for a rally in steelmaking, the scrap market broke sharply last week. STEEL's price composite, based on the No. 1 heavy melting grade at Pittsburgh, Chicago, and eastern Pennsylvania, fell $1 to $29.17 a ton, lowest since early 1954.

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*Current prices were published in the Oct. 31 issue and will appear in subsequent issues.

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STEEL
QUARTERLY SURVEY

MILL PRODUCTS	CURRENT INVENTORIES					1st Quarter FORECAST		
	UNDER 10 DAYS	10-30 DAYS	30-60 DAYS	60-90 DAYS	3-6 MONTHS	LOWER	SAME	HIGHER
HOT-ROLLED CARBON BARS	10%	22%	44%	20%	4%	23%	76%	1%
COLD-FINISHED BARS	—	23%	49%	17%	11%	29%	66%	5%
H & C-R SHEETS, STRIP	9%	15%	47%	21%	8%	34%	60%	6%
LIGHT PLATES	14%	13%	43%	25%	5%	30%	62%	8%
HEAVY PLATES	13%	16%	34%	34%	3%	25%	67%	8%
STRUCTURAL SHAPES	10%	17%	43%	27%	3%	36%	58%	6%
COPPER & BRASS	23%	8%	53%	13%	3%	26%	65%	9%
ALUMINUM	18%	13%	46%	18%	5%	23%	60%	17%

FIGURES are percentages of respondents to STEEL's quarterly survey.
UNDERSCORED figures show how most respondents reported.

More Paring of Metal Stocks Ahead

Nearly a third of the purchasing agents polled by STEEL plan to cut inventories through Apr. 1. Outlook: No upturn in buying before the second quarter

THE PROSPECT for an upturn in metal purchases indicated by the last STEEL survey of metal buyers (Aug. 1, p. 109) has fizzled.

Despite a slight, though less than seasonal upturn in business, respondents now indicate they will continue inventory paring through the first quarter of 1961. Reductions are planned by 32 per cent compared with 27 per cent targeting such goals in the last survey. The number of buyers expecting to build inventories fell for the third consecutive quarter to 6 per cent.

• **Upswing Not Near**—So if a definite pickup should come, it isn't likely to appear before the second quarter of next year or later. The optimists feel this points to a period of "rolling adjustment." However, the pessimists are quick to emphasize that in 1957, "rolling adjustment" gave way to "inventory readjustment," then "recession."

The latest report of the National Association of Purchasing Agents (see STEEL, Oct. 17, p. 101) shows inventories are down for the sixth consecutive month, a fairly long downtrend by historical standards. The NAPA says agents believe stocks warrant further trimming, adding that unless orders pick up, it could be some time before ideal inventory positions are reached.

Although a large number of respondents to STEEL's quarterly survey reveal stocks are at desired levels, the consensus feels "good balance" won't be achieved for slightly more than two months. Contrary to earlier plans for a more stable quarter, purchasing agents are continuing inventory reductions at a relatively fast pace, with 33 per cent of those polled having lower reserves now than at this time in the third quarter and only 9 per cent registering an increase. Lower inventories, with reliance on quick delivery from the mills, seem to be the byword.

• **How They Stand**—Stocks in all categories over 60 days showed a

decline which was especially sharp in heavy and light plates and structural shapes. Hot and cold rolled sheets and strip recorded heavy reductions in levels over 90 days. All ferrous stocks in the 30 to 60 day grouping rose. Except for cold finished bars, the under 10 days' reserves showed a marked increase. Inventory levels in the 10 to 30 day category were mixed.

• **Overstocks Drop** — Overstock complaints continued the downtrend begun after peaking at 40 per cent in July, with 29 per cent of the respondents presently having problems. Of the many products mentioned, structurals and hot rolled alloy bars were in the greatest abundance, closely followed by cold rolled sheets and strip and seamless tubing.

Delivery problems slid to a mere 1 per cent, the lowest point since recession ridden 1958. Due to the strike, such complaints were noted by more than 60 per cent of the purchasing agents at this time last year.

• **Nonferrous** — Aluminum and copper users are also still slicing inventories. More than 26 per cent of the copper buyers will lower reserves in the first quarter as will 23 per cent of the aluminum buyers. Only 9 per cent of STEEL's respondents will increase copper stocks; 17 per cent will add to their aluminum inventories. Both metals are plagued by production levels which exceed consumption.

Imported Steel Tonnage Off Despite Lower Prices

The changing pattern of foreign trade in steel over the last year is reflected by the August statistical report of the U. S. Commerce Department.

Exports in the month (excluding scrap) totaled 356,579 net tons (valued at $73,247,473) compared with 96,812 tons (valued at $28,014,633) in August, 1959.

The total for the first eight months was 2,384,812 tons (valued at $529,028,458) vs. 1,705,700 (valued at $402,137,114) in the same period of 1959.

While exports are tending upward, the trend of imports now is downward. August imports (excluding scrap) totaled 252,222 net tons (valued at $33,684,038) compared with 443,623 tons (valued at $52,597,755) in the like 1959 month.

Imports in the first eight months totaled 3,024,447 tons (valued at $423,434,245) compared with 3,308,347 tons (valued at $374,886,250) in the like 1959 period.

A further dip in prices on steel for export to this country from Western Europe has failed to stimulate much activity, importers say Some products have been marked down as much as $5 and $10 a ton, including merchant bars, reinforcing bars, structurals, wire rods, and nails.

Consumers in this country are not pressed for tonnage, and are willing to mark time for the present, especially since some easing in demand is reported in Europe. Deliveries of Western European steel to this country are the easiest in some time. Most products can be had within six to eight weeks.

The California steel market is now dominated by imported material, says H. H. Fuller, vice president, Bethlehem Steel Co. and head

"...easy Joe, that baby's worth a quarter million!"

NEW DESPATCH OVEN DRIES TRANSFORMERS SAFELY, ECONOMICALLY

When products are worth $250,000 apiece, processing mistakes can be costly.

That's why Wagner Electric Co., St. Louis, called on Despatch for a moisture removal oven.

This new Despatch oven performs exactly according to specification. It also increases productive capacity and makes operations more versatile.

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"We considered many other types," reports company official Charles Ruder, "but Despatch proved to be up to twice as economical."

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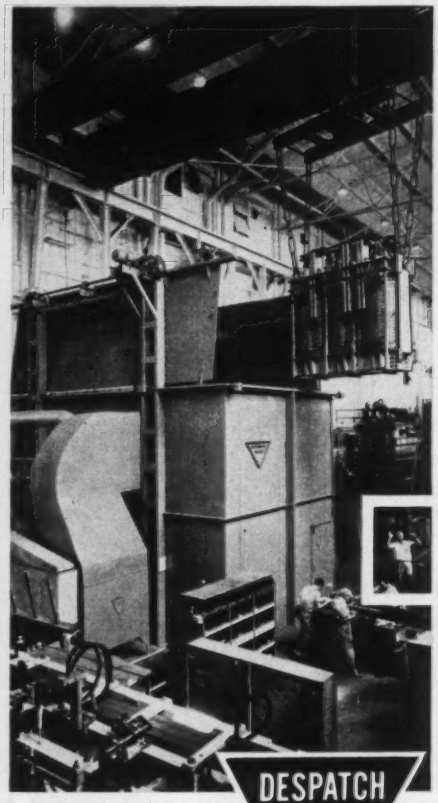
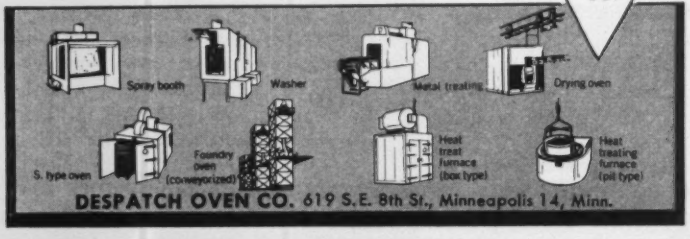


DESPATCH OVEN CO.



DESPATCH OVEN CO. 619 S.E. 8th St., Minneapolis 14, Minn.

DESPATCH—INDUSTRY LEADERS FOR 58 YEARS

of its West Coast Div. Examples cited: 90 per cent of the nails used in the state come from abroad; more than 50 per cent of the butt-weld pipe used is foreign; more than 40 per cent of the wire rods, and virtually all of the barbed wire used are foreign-produced.

Latest figures, he says, indicate 305,000 net tons of steel mill products entered California ports in the six months ended June 30. That was 24 per cent more than in the like 1959 period.

Tubular Goods . . .

Tubular Goods Prices, Page 155

A flurry of releases from automakers following the National Auto Show in Detroit has given mechanical tubing producers hope that they'll ship as much tonnage this month as they sold in October. A small tubemaker in the Pittsburgh area who depends heavily on automotive business is shipping at 70 per cent of capacity.

Customers who have cut their inventories to abnormally low levels are demanding one week service. They're not getting it—four to six weeks is normal, but they're keeping the pressure on their suppliers.

The latest weekly survey by the Hughes Tool Co. shows the U. S. and Canada have 1842 rotary oil drilling rigs in operation, a drop of 53 from the preceding week's total. The U. S. had 1693 rigs active, down 45, while Canada had 149, down eight.

Cast iron pipe makers are optimistic for a good volume of business next year.

Sheets, Strip . . .

Sheet & Strip Prices, Pages 150 & 151

Consumers are still using more sheets than they are buying, but the outlook for a pickup in orders this month continues bleak. October was a poor month—worse than September for some mills—and few sheetmakers think they'll do any better in November and December. Some deferred releases, however, are now coming through.

Most users' stocks are well below normal. Once mill deliveries begin to tighten up, buyers will start rebuilding their inventories. Just when that will come, though, remains to be seen, for most consumers are still having no difficulty obtaining shipments within two to three weeks on hot rolled sheets, two to five weeks on cold rolled, and three to four weeks on galvanized. Specialties, such as electrical sheets and enameling stock, are available in three to four weeks.

Relatively, sheets are moving better than the other major steel products. In fact, here and there, individual consumers are showing more interest.

Automakers, instead of increasing their steel inventories and pressing dealers to stock up on new cars in anticipation of a good spring selling season as they usually do, are gearing their output to current sales. Reasons: 1. They want to see which direction the economy will take before committing themselves to heavy purchases. 2. They know they can get all the steel they want on short notice—the Pittsburgh area plant of GM's Fisher Body Div. recently told suppliers its 18 day inventory of sheets was too high.

Superior Steel Div., Copperweld Steel Co., Carnegie, Pa., on Oct. 31 posted lower prices on copper clad

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strip as follows: Cold rolled, clad 10 per cent, two sides, $43.40 per 100 pounds against $44.20 formerly, and cold rolled, clad 10 per cent, one side, $36.35 against $36.80.

Steel Bars . . .

Bar Prices, Page 149

Although producers of hot rolled bars booked a little more tonnage last month than they sold during September, they aren't happy about business prospects over the rest of the year.

Orders seem to have leveled off, and barring a spurt in new car sales, automakers aren't likely to follow the usual pattern of releasing big orders in November and December. They're afraid of overloading dealers whose car inventories are already above normal. At the same time, service centers are buying only on a fill-in basis.

In the East, the only buying bulge of note is by small arms shops in New England and arsenals. Raritan Arsenal (N. J.) is closing Nov. 21 on 193 tons of alloy bars. Consumption by most users, including bolt specialties, has not improved much. They are buying largely hand to mouth.

Keystone Drawn Steel To Double Its Bar Capacity

Keystone Drawn Steel Co., Spring City, Pa., has signed contracts for a $450,000 expansion that will increase the company's manufacturing space by 40 per cent and double its capacity to automatically produce cold drawn and polished steel bars. It will also extend Keystone's size range to include bars 3/16 to 1 in. in diameter.

Wire . . .

Wire Prices, Pages 151 & 152

Demand for manufacturers' wire is reported edging up slowly at some market centers, but, in general, volume hasn't changed materially the last four or five months. Shipments to the automotive industry continue disappointing, and the slight pick-up in orders recently hasn't had any particular bearing on delivery schedules, which still run ten days.

Auto and truck seat manufacturers have big wire inventories. What's more, they've been replacing helical springs with zigzag construction, reducing spring consumption. Bedding manufacturers are the most active buyers of spring wire, but their buying is seasonal and will soon taper off. Utilities are buying core wire for ACSR conductors on a fairly steady basis.

Buying of merchant wire products continues sluggish. Shipments are available from stock.

A slight increase in wire rod orders reflects slow buying of drawn wire and other finished products. More than half the industry's wire rod capacity is idle, and with the exception of a few mills producing specialties, including high carbon, finishing departments are only a few points higher.

Wire rod shipments will approximate 975,000 tons this year and drawn wire nearly 2.5 million tons. That confirms heavy dependence on inventories and imports through the greater part of 1961. In some cases, screw manufacturers and other users of wire products are operating almost exclusively on foreign rods.

in furnace lining...

Plicast Monolithic Castables

better 4 ways

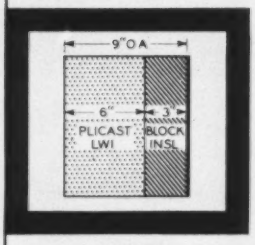
Study was made using special and ordinary linings in a car type annealing furnace operating at an inside temperature of 1800° F. Plicast LWI Insulating Castable and fire brick were compared to determine the hourly heat loss and heat storage capacity for each square foot of furnace wall.

1 **Heat loss 33% less . . . heat storage capacity 91% less with Plicast.** Outcome of the test illustrated to the right shows savings gained using lighter two-component wall poured with Plicast LWI Castable backed with block insulation.

2 **Cost of operating furnace much less with Plicast.** In this test $1,380 (14%) was saved in fifty weeks operating a car type furnace with a wall area of 300 square feet 8 hours daily, 5 days a week.

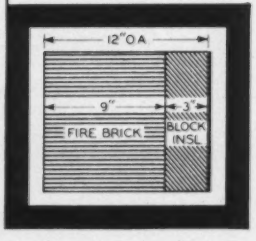
3 **Less material and maintenance needed with Plicast.** These results were obtained with one-third less refractory material in the walls and arch.

4 **Larger furnace capacity with Plicast.** The thinner walls added 6 inches in width, 3 inches in depth and height to the inside dimensions.



PLICAST
Heat storage: 3,650 btu/sq. ft.
3,650 btu = 3.6 cu. ft. gas
or: .025 gal. oil
Heat loss: 180 btu/sq. ft.
(still air at 70° F.)
180 btu = 180 cu. ft. gas
or: .0012 gal. oil

FIRE BRICK
Heat storage: 42,000 btu/sq. ft.
42,000 btu = 42 cu. ft. gas
or: .29 gal. oil
Heat loss: 270 btu/sq. ft.
(still air at 70° F.)
270 btu = 0.263 cu. ft. gas
or: .0019 gal. oil



Write for Case Study Report giving complete data on 4-way savings or call your local Plibrico man to see how much you can save on your refractory lining.

Plibrico REFRACTORIES

PLIBRICO COMPANY, 1806 Kingsbury, Chicago 14
Plibrico Sales & Service in Principal U. S. Cities & Canada
REFRACTORY PRODUCTS • ENGINEERING • CONSTRUCTION

9208

Plates . . .

Plate Prices, Page 149

Demand for carbon plates remains slow, and, generally, producers see no prospects for early improvement. Mill operations are sluggish, and deliveries on sheared and universal plates hold around two weeks, with promises on alloy plates ranging four to seven weeks.

The shipyards are likely to be among heaviest buyers of plates during the first half of next year. Demand for tanks, weldments, and other industrial outlets is spotty, and platemakers are competing sharply for tonnage.

An increasing ratio of high tensile, low alloy grades, compared with carbon, is a definite trend, notably for pressure vessels. Stainless and clad plates, however, are specified where corrosion is a problem. Paper mills are increasing their stainless and clad specifications.

The Maritime Board has named Bethlehem Steel Co. low bidder for construction of six cargo ships for U. S. Lines at $58,782,000.

Iron Ore Stocks Are Well Above Last Year's Total

Stocks of iron ore in the U. S. and Canada (from all sources) at the end of September totaled 77,794,559 gross tons vs. 63,344,214 at the same time a year ago. Of the total, 74,129,653 tons were in the U. S. (vs. 60,552,579 a year ago) and 3,664,906 in Canada (vs. 2,791,635 a year ago).

Lake Superior iron ore stocks amounted to 47,230,578 tons vs. 35,027,987, while other U. S. ores accounted for 3,654,821 tons against 3,080,872 a year ago. Stocks of Canadian ore were: Lake Superior, 2,373,926 vs. 2,226,086, and other Canadian ores, 6,790,339 against 9,220,667. Stocks of foreign ore (other than Canada) amounted to 17,744,895 tons vs. 13,788,602 last year at the end of September.

Iron ore consumption in September totaled 6,872,212 gross tons, compared with 2,030,977 a year ago when the steel strike idled most of the nation's blast furnaces. Consumption in the first nine months this year was 88,248,702 tons vs. 79,043,219 in the same period of 1959.

Active blast furnaces at the start of October numbered 146, of which 136 were in the U. S. and 10 in Canada. A year ago, only 46 stacks were blowing, 33 in the U. S. and 13 in Canada.

Pig Iron . . .

Pig Iron Prices, Page 156

Pig iron demand is expected to continue slow during the next several months. One seller in the Philadelphia area says the latest slide in buying is the most pronounced in weeks.

Many foundries are working only four days a week and fear further cutbacks. No pickup is expected before the beginning of the second quarter.

Merchant iron producers plan to hold output around current levels for the rest of the year unless a sudden upswing in demand should develop, warranting the lighting of additional furnaces. Shenango Furnace Co. took off its Sharpsville, Pa., blast furnace for repairs and planned to relight the stack in about a week.

Youngstown Sheet & Tube Co.

GOLD STAR SR

This d-c rectifier type welder does more things better than any other welder of its class because —

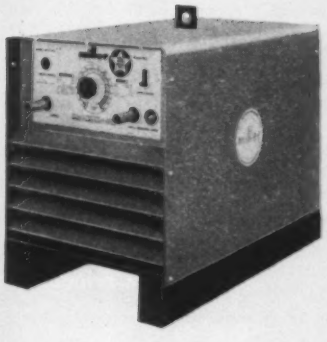
a. Its new transformer (Miller designed and built) has integral flux diverter.
b. Its new weld stabilized circuit delivers the ultimate in speed of metal deposition.
c. Its new completely sealed semi-metallic rectifier — designed for welding — provides the most efficient d-c for welding ever devised.

These features contribute to the Gold Star SR's greater arc stability, denser welds, easy arc starting and flexibility to handle all electrodes in all positions.

Performance-proved wherever profits are important, the Gold Star SR is available in single and duplex models of 200 to 1200 amperes at 60% duty cycle ratings.

miller WELDERS

GOLD STAR
All-Weather
SRH

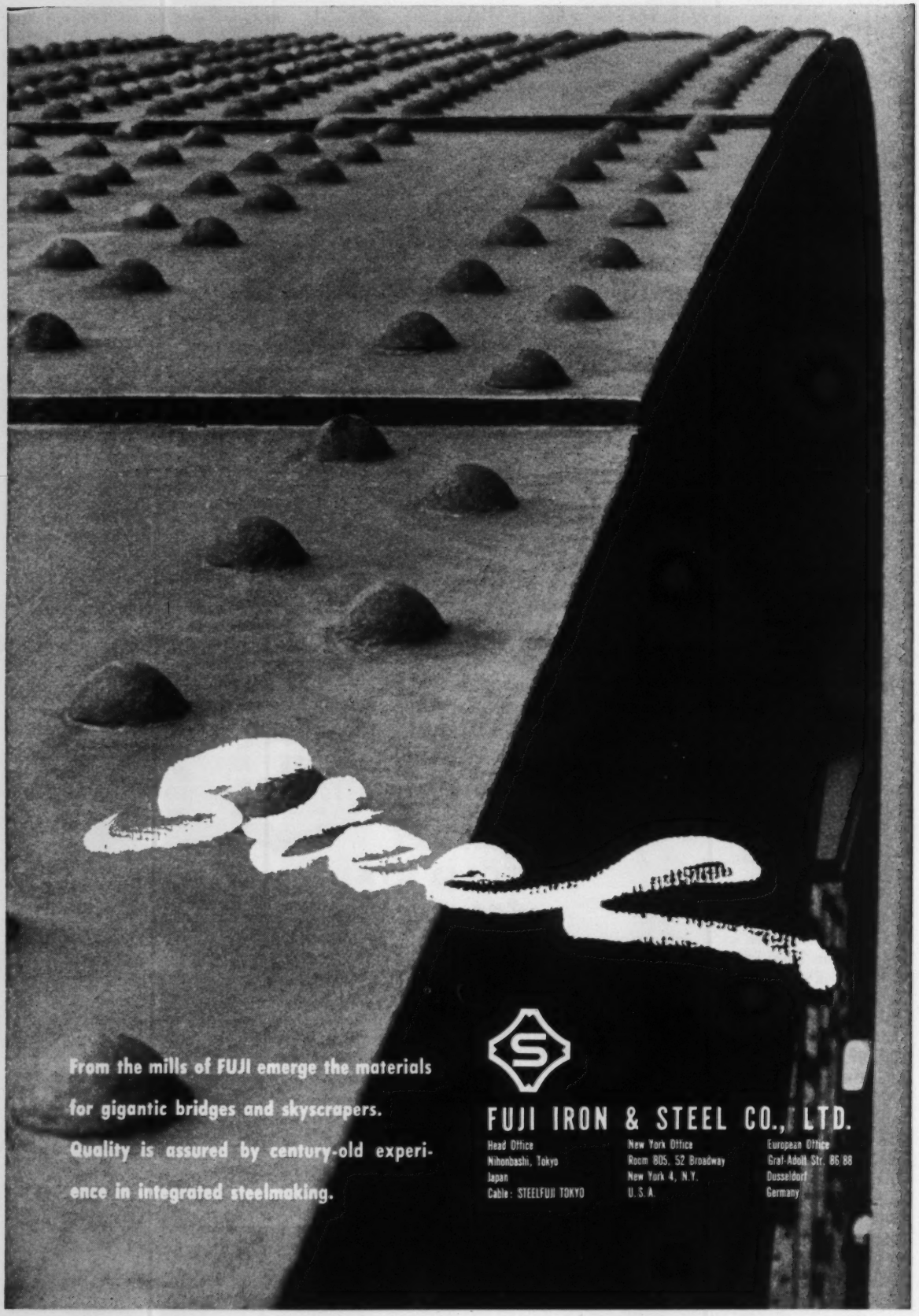


The features that set the SR above and beyond the normal standards of welder performance belong to the SRH also. But, in addition to the horizontal design for easier stacking and paralleling, this welder has an "all-weather" construction that includes baked varnish coated transformers and rectifiers plus phosphatizing and painting of all base and sheet metal — even fan blades. Cam-Lok receptacles are standard equipment. The Gold Star SRH welds real well.

Complete specifications on these Gold Star models will be sent promptly.

miller ELECTRIC MANUFACTURING COMPANY, INC., APPLETON, WISCONSIN

• Distributed in Canada by Canadian Liquid Air Co., Ltd., Montreal



From the mills of FUJI emerge the materials for gigantic bridges and skyscrapers. Quality is assured by century-old experience in integrated steelmaking.

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New York 4, N.Y.
U.S.A.

European Office
Graf-Adolf Str. 86/88
Dusseldorf
Germany

banked its No. 1 blast furnace at the Campbell Works, mainly because of the low price of scrap.

From Troy, N. Y., the rate on 56 ton shipments of iron has been reduced to $6.64 a gross ton to alternate with the present rate of $7.85 on 28 ton shipments.

Distributors . . .

Prices, Page 156

Steel service centers are booking orders at about the same rate as they did the last two or three months, but the tonnage for November will likely show a drop due to fewer working days.

The recent rail rate increase will be absorbed by the distributors in most instances. One service center points out that conditions are too competitive to pass along such costs to the consumer; that it is too expensive, considering the size of the increase, to set up new price lists; and that most shipping is done by truck.

The price tone of the market is weak. Some independent service centers are overloaded with structurals and are in a mood to make concessions. The sales representative of a major service center chain complained recently in Pittsburgh that a small competitor cut his price by $600 to land a 28 ton order for miscellaneous shapes.

Some foreign steel remains unsold in the Pacific Northwest. That continues to be an upsetting price factor in that area. Buyers appear to be influenced by price only, overlooking quality, service, and other advantages offered by established distributors of domestic material.

Structural Steel Tonnage Bookings Slip Slightly

Structural steel bookings in September were off slightly from August's, totaling 259,986 tons vs. 261,976. But the total for the first nine months was on the plus side —2,527,861 tons vs. 2,352,483 tons in the same period of 1959.

September shipments amounted to 323,516 tons, down a little from the 331,932 tons moved in August and the 332,694 tons shipped in June, but the total marked the fourth consecutive month in which the industry delivered more than 300,000 tons. September shipments were 77 per cent greater than the tonnage moved in the corresponding period of 1959 when the steel strike hindered deliveries.

The tonnage moved in the first nine months this year was 2,587,712 tons, an increase of 13 per cent over the 2,292,636 tons moved in the like 1959 period.

Order backlogs as of Sept. 30 amounted to 2,058,047 tons. Of that total, 57 per cent (1,183,159 tons) are scheduled for fabrication during the four months ending Jan. 31.

Structural Shapes . . .

Structural Shape Prices, Page 149

While structural steel business has firmed up some, the over-all trend in building construction is generally down and is expected to continue so into early next year. That's a seasonal development, and indications are competition for new work will become increasingly stiff, though fabricated prices currently appear to be a little firmer than they were.

Fabricators complain that inquiries are few, with some large industrial expansion programs being postponed because of poor third quarter earnings and disappointing prospects for business in the months immediately ahead.

After long delays, structural tonnage for urban development, including office and commercial buildings, is gaining momentum. Hartford, Conn., placed 4500 tons for two office buildings, and other cities are expected to be heard from soon. Structural tonnage for this type construction will be substantially heavier in 1961.

Although there's the possibility of a steel price increase next month, few fabricators are hedging against it. One Pittsburgh area company that has been operating at a higher level than most of its competitors plans to increase its stocks a little. Structural shape delivery promises still run two to four weeks.

STRUCTURAL SHAPES . . .

STRUCTURAL STEEL PLACED

4500 tons, two office buildings, Constitutional Plaza Inc., including structure for Connecticut Bank & Trust Co., urban redevelopment, Hartford, Conn., to Bethlehem Steel Co., Bethlehem, Pa.; F. H. McGraw & Co., Hartford, general contractor.

2200 tons, warehouse, Food Fair Supermarkets, Philadelphia, to Belmont Iron Works, Eddystone, Pa.; also, 825 tons of bar joists and 1300 tons of bars to American Steel Engineering Co., Philadelphia.

1600 tons, improvement, ways, second phase contract, Naval shipyard, Portsmouth, N. H., to Waghorne-Brown, Boston, Bethlehem Fabricators Inc., Bethlehem, Pa.; Five Bros. Construction Corp., New York, general contractor; 50 tons of concrete reinforcing bars to Bethlehem Steel Co., Bethlehem, Pa.

1000 tons or more, annex, Old Age & Survivors Insurance Bldg., General Services Administration, Baltimore, to Barber & Ross Co., Baltimore (structurals), and Capital Steel Corp., Baltimore (reinforcing bars), through Piracci Construction Co., Baltimore, general contractor.

500 tons, bins and silos for Seattle plant, Ideal Cement Co., to United Concrete Pipe Co., Auburn, Wash.; Hoffman Construction Co., Portland, Oreg., general contractor.

302 tons, office building, State Labor Department, Wetherfield, Conn., to National Steel Fabricators, Newington, Conn.; Anderson-Fairoaks Inc., Hartford, Conn., general contractor.

300 tons, three, 300 ton traveling cranes and one, 150 ton trolley and hoist, three powerplants, Central Valley project, Bureau of Reclamation, Denver, to Star Iron & Steel Co., Tacoma, Wash.

250 tons, bridge for Skagit County, Wash., to Bellingham Shipyards, Bellingham, Wash.; Croy Construction Co., Bellingham, general contractor.

170 tons, state highway bridge, Winchester, N. H., to Bancroft & Martin Rolling Mills Co., South Portland, Maine, through R. W. Payne Inc., Keene, N. H., general contractor.

120 tons, Building 82, and alterations to Buildings 7 and 61, Veterans Hospital, Bedford, Mass., to Groisser & Shlager Iron Works, Somerville, Mass.; John A. Volpe Construction Co., Malden, Mass., general contractor; 90 tons, concrete reinforcing bars to Bethlehem Steel Co., Bethlehem, Pa.

STRUCTURAL STEEL PENDING

11,160 tons, structurals, including I-beams and plates, Supply Department, Puget Sound Naval Shipyard, Bremerton, Wash.; bids Nov. 18.

1500 tons, plant expansion, Ballantine Brewery, Newark, N. J., United Engineers & Constructors, Philadelphia, contractor.

1389 tons, bridgework, New Jersey Turnpike Authority, Middlesex and Union Counties, New Jersey; bids Dec. 11; also required, 368 tons of reinforcing steel.

834 tons, New England ramp at Morgan Street interchange Hartford, Conn.; Savin Bros. Inc., Bloomfield, Conn., low on general contract; also, 240 tons of concrete reinforcing bars, and 122 tons of steel piles.

750 tons, radio transmitting and receiving station, Greenville, N. C.; bids asked.

700 tons, estimated, plant and office, American Can Co., Chambersburg, Pa.; bids asked.

600 tons, grain elevator, Kalama, Wash.; bids in Nov. 1.

450 tons, state bridgework, Berks County, Pennsylvania, Latrobe Road Construction Inc., Latrobe, Pa., low on general contract.

382 tons, bridge, Maine Central Railroad and

FOR SALE

One new Electric Arc Furnace Charging Bucket Including Bale
Type: Cable Operated—Clamshell
Capacity: 1486 Cu. ft. = 55 tons
Max Dia Closed: 17'-9"
Max Dia Opened: 18'-8"
Max Dia Bottom Opening 12'-6"
Distance from Eye of Bale to Bottom of Bucket Open and closed 14'-0"
Weight: 48,000 lbs.

Reply to Box #875, STEEL
Penton Bldg., Cleveland 13, Ohio

Perry Road, Bangor, Maine; bids Nov. 16 to Augusta, Maine.

244 tons, state bridgework, RC 60-168, Westchester County, New York; Mt. Vernon Contracting Co., Mt. Vernon, N. Y., low on the general contract.

250 tons, Post Office terminal addition, Philadelphia; McCloskey & Co., Philadelphia, low.

170 tons, including reinforcing (71 tons) and steel piles (77 tons), Auburn, N. H.; bids Nov. 17.

150 tons, J. C. Penney store, Spokane, Wash.; bids in.

150 tons, relocation of bridge, Beaverhead County, Montana; general contract to Cherf Bros. and Sankay, Sime, Ephrata, Wash.; joint low at $1,395,336 to the Bureau of Reclamation.

135 tons, also 70 tons of reinforcing, rebids on conversion of the Copper River bridge, Alaska; bids to T. D. Sherrard, director, Juneau.

130 tons, also 100 tons of reinforcing, towers and transmission facilities; Chugach Electric Association, Anchorage, Alaska; bids postponed to late November.

125 tons, angles, Navy, General Stores Supply Office, Philadelphia; bids Nov. 15; also, 196 tons of carbon sheets, bids, Nov. 12.

114 tons, state bridgework, RC 60-176, Sullivan County, New York; no bids submitted Oct. 20.

110 tons, including reinforcing bars, four span steel bridge, Enfield-Lebanon, N. H.; Perini Corp., Framingham, Mass., low on general contract.

100 tons, also steel piling, 240 ft Eagle River bridge; bids to Alaska Department of Public Works, Juneau, Alaska.

Unstated, General Electric Co. office and warehouse, Portland, Oreg., a $750,000 project; bids in Oct. 25.

REINFORCING BARS . . .

REINFORCING BARS PLACED

5300 tons, $13,192,000 federal office building No. 9, Civil Service Commission, Washington, through John McShane Inc., general contractor, to Sweets Steel Co., Williamsport, Pa.

2125 tons, comprising 1300 tons of reinforcing bars and 825 tons of bar joists, warehouse, Food Fair Supermarkets, Philadelphia, to American Steel Engineering Co., Philadelphia; also placed, 2200 tons of structural steel with Belmont Iron Works, Eddystone, Pa.

2000 tons, junior high school, Board of Education, Philadelphia, to American Steel Engineering Co., Philadelphia.

1650 tons, residential college buildings (Stiles & Morse) Yale University, New Haven, Conn., to Igoe Bros., Jersey City, N. J., through E. & F. Construction Co., Bridgeport, Conn., general contractor.

900 tons, silos, etc., Ideal Cement Co. plant, Seattle, to Joseph T. Ryerson & Son Inc., Seattle; Hoffman Construction Co., Portland, Oreg., general contractor.

560 tons, office building, State Department of Labor, Wethersfield, Conn., to Scherer Steel Co., East Hartford, Conn.; Anderson-Fairoaks Inc., Hartford, Conn., general contractor.

500 tons, glass production plant, American-Saint-Gobain Corp., Kingsport, Tenn., to Connors Steel Div., H. K. Porter Company Inc., Birmingham; tanks to Chicago Bridge & Iron Co., Chicago; Daniel Construction Co. Inc., Greenville, S. C., general contractor.

386 tons, high school, Clinton, Mass., to Northern Steel Inc., Boston, through Tocci Bros. Construction Co., Newton, Mass., general contractor.

276 tons, elementary school, Cambridge, Mass., to Bethlehem Steel Co., Bethlehem, Pa.; Charles Logue Building Co., Newton, Mass., general contractor; 93 tons of fabricated structural steel placed with West End Iron Works, Cambridge.

373 tons, science building, Georgetown University, Washington, through John McShane Inc., Philadelphia, to Sweets Steel Co., Williamsport, Pa.

175 tons, substructure, Gimbel store, Philadelphia, to Bethlehem Steel Co., Bethlehem, Pa.

130 tons, Skagit County bridge and Washington State highway pass, to Pacific Coast Div., Bethlehem Steel Co., Seattle; Croy Construction Co., Bellingham, Wash., general contractor.

100 tons or more, hull frames, steel extrusions, high tensile, Grade Hy-80, Naval Supply Center, Oakland, Calif., to Metal Processing Div., Curtiss-Wright Corp., Buffalo, at $258,384.

52 tons, Industrial Transfer Co. building, Seattle, to Pacific Coast Div., Bethlehem Steel Co., Seattle; Howard S. Wright Construction Co., Seattle, general contractor.

REINFORCING BARS PENDING

3500 tons, two Washington State bridges, Spokane County; bids postponed to Nov. 1 at Olympia, Wash.

420 tons, state bridgework, Fayette County, Pennsylvania; bids Nov. 18.

377 tons, state bridgework, Beaver County, Pennsylvania, bids Nov. 10; also required, 2500 tons of structural steel.

368 tons, bridge and highway work, New Jersey Turnpike Authority, New Brunswick, N. J., for construction in Middlesex and Union Counties, New Jersey; bids Dec. 1; also, 1389 tons of structural steel required.

300 tons, General Services building, Anchorage, Alaska; general contract awarded jointly to Lathrop Co., Anchorage, and Lease Co. Inc., Seattle.

190 tons, two Washington State girder spans, Whatcom County; Lockyear & White, Longview, Wash., low at $415,477.

180 tons, Idaho State railway overpass, Nez Perce County; also 75 tons for highway projects, Bonner and Idaho counties; bids to Boise, Nov. 15.

105 tons, two Maple Valley transmission line projects; Nat Harrison Associates, Miami, Fla., and C. E. Skinner, Orting, Wash., low at $440,068 and $149,128 to the Bonneville Power Administration, Portland, Oreg.

130 tons, Charles River improvements, Milford, Mass.; Joseph Perry Inc., New Bedford, Mass., low on general contract.

75 tons, Washington State, Ferndale underpass; general contract to Croy Construction Co., Bellingham, Wash.

PLATES . . .

PLATES PENDING

850 tons, 10,085 ft 51 in. water supply line, Beacon Hill, Seattle; O. R. Alla Inc., and Erickson Paving Co., Seattle, low at $400,480; Frank Coluccio Construction Co., Seattle, low at $355,895 for alternative concrete.

594 tons, wrought homogeneous, ⅜ to 8 in., Procurement Branch, Aberdeen Proving Grounds, Md.; bids Nov. 15.

500 tons or more, Chief Joseph pipeline, Wenatchee, Wash., bids postponed to Nov. 3 from Oct. 27.

225 tons, 500,000 gallon elevated water tank, Andrews Air Force Base, Md.; bids Nov. 9, to the U. S. Engineer, Washington.

151 tons, carbon hull plates, Navy, General Stores Supply Office, Philadelphia; bids Nov. 10.

114 tons, high tensile, Grade Hy-80, Naval shipyard, Portsmouth, N.H.; bids Nov. 21 to the Navy Supply Officer.

PIPE . . .

CAST IRON PIPE PENDING

636 tons, 6 to 18 in., King County District No. 99, Seattle, rebids No. 8.

RAILS, CARS . . .

RAILROAD CARS PLACED

Great Northern, 500, fifty ft. boxcars to its own shops at St. Cloud, Minn.; the carrier also contemplates the award of 50, forty ft boxcars; ten caboose cars; 100, fifty ft. mechanical express cars; and 100, special type cars for its subsidiary, Western Fruit Express.

DISTRICT INGOT RATES

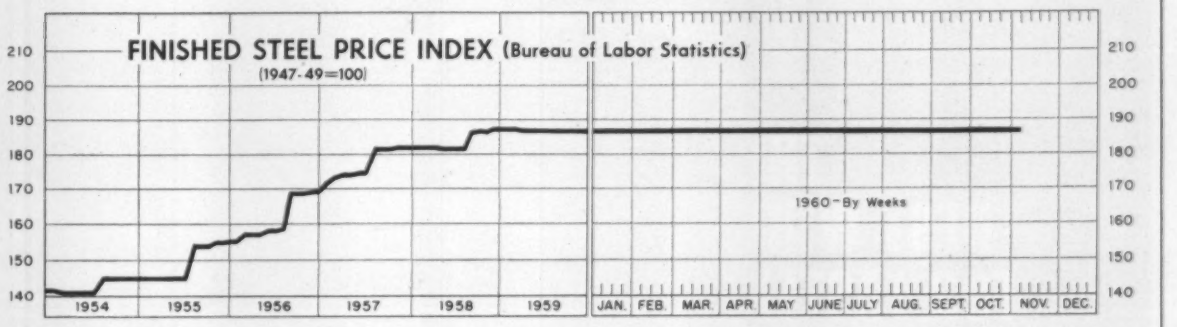
(Percentage of capacity utilized)

	Week Ended Nov. 6	Week Ago	Month Ago	Year Ago
Northeastern	55	57	66	*
Buffalo	58	60	18	*
Pittsburgh	47	48	46	*
Youngstown	42	43	46	*
Cleveland	57	57	59	*
Detroit	63	73	71	*
Chicago	51	56	58	*
Cincinnati	60	61	62	*
St. Louis	77	78	82	*
Southern	53	51	45	*
Western	45	49	54	*
Total Industry	51.7	54.2	53.4	13.0
Index (1947-49=100)	91.7	96.2	94.7	22.9
Net Tons (In thousands)	1,473	1,545	1,522	368

Current week's figures are preliminary. Weekly capacity (net tons): 2,849,306 in 1960 and 2,831,331 in 1959. Source: American Iron & Steel Institute. *Not available due to general strike.

NATIONAL STEELWORKS OPERATIONS

Price Indexes and Composites



Nov. 1, 1960	Week Ago	Month Ago	Oct. Index	Year Ago
186.2	186.2	186.2	186.2	186.8

AVERAGE PRICES OF STEEL (Bureau of Labor Statistics)

Week Ended Nov. 1

Prices include mill base prices and typical extras and deductions. Units are 100 lb except where otherwise noted in parentheses. For complete description of the following products and extras and deductions applicable to them, write to STEEL.

Rails, Standard No. 1	$5.825	Bars, H.R., Carbon	6.675
Rails, Light, 40 lb	7.292	Bars, Reinforcing	6.335
Tie Plates	6.875	Bars, C.F., Carbon	10.710
Axles, Railway	10.175	Bars, C.F., Alloy	14.125
Wheels, Freight Car, 33 in. (per wheel)	62.000	Bars, C.F., Stainless, 302 (lb)	0.570
Plates, Carbon	6.350	Sheets, H.R., Carbon	6.350
Structural Shapes	6.167	Sheets, C.R., Carbon	7.300
Bars, Tool Steel, Carbon (lb)	0.560	Sheets, Galvanized	8.775
Bars, Tool Steel, Alloy, Oil Hardening Die (lb)	0.680	Sheets, C.R., Stainless, 302 (lb)	0.655
Bars, Tool Steel, H.R. Alloy, High Speed, W 6.75, Cr 4.5, V 2.1, Mo 5.5, C 0.060 (lb)	1.400	Sheets, Electrical	12.625
Bars, Tool Steel, H.R. Alloys, High Speed, W18, Cr 4, V 1 (lb)	1.895	Strip, C.R., Carbon	9.489
Bars, H.R., Alloy	10.775	Strip, C.R., Stainless, 430 (lb)	0.480
Bars, H.R., Stainless, 303 (lb)	0.543	Strip, H.R., Carbon	6.250
		Pipe, Black, Buttweld (100 ft)	19.495
		Pipe, Galv., Buttweld (100 ft)	23.098
		Pipe, Line (100 ft)	195.430
		Casing, Oil Well, Carbon (100 ft)	201.080
		Casing, Oil Well, Alloy (100 ft)	315.213
		Tubes, Boiler (100 ft)	51.200
		Tubing, Mechanical, Carbon (100 ft)	27.005
		Tubing, Mechanical, Stainless, 304 (100 ft)	194.268
		Tin plate, Hot-dipped, 1.25 lb (95 lb base box)	10.100
		Tin Plate, Electrolytic, 0.25 lb (95 lb base box)	8.800
		Black Plate, Canmaking Quality (95 lb base box)	7.900
		Wire, Drawn, Carbon	10.575
		Wire, Drawn, Stainless, 430 (lb)	0.665
		Bale Ties (bundles)	7.647
		Nails, Wire, 8d Common	9.433
		Wire, Barbed(80-rod spool)	8.414
		Woven Wire Fence (20-rod roll)	21.003

STEEL's FINISHED STEEL PRICE INDEX

	Nov. 2 1960	Week Ago	Month Ago	Year Ago	5 Yr Ago
Index (1935-39 avg=100)	247.82	247.82	247.82	247.82	208.90
Index in cents per lb	6.713	6.713	6.713	6.713	5.659

STEEL's ARITHMETICAL PRICE COMPOSITES

Finished Steel, NT	$149.96	$149.96	$149.96	$149.96	$128.14
No. 2 Fdry, Pig Iron, GT.	66.49	66.49	66.49	66.49	58.99
Basic Pig Iron, GT	65.99	65.99	65.99	65.99	58.49
Malleable Pig Iron, GT	67.27	67.27	67.27	67.27	59.77
Steelmaking Scrap, GT	29.17	30.17	30.67	45.33	45.17

Comparison of Prices

Comparative prices by districts in cents per pound except as otherwise noted. Delivered prices based on nearest production point.

FINISHED STEEL

	Nov. 2 1960	Week Ago	Month Ago	Year Ago	5 Yr Ago
Bars, H.R., Pittsburgh	5.675	5.675	5.675	5.675	4.65
Bars, H.R., Chicago	5.675	5.675	5.675	5.675	4.65
Bars, H.R., deld., Philadelphia	5.97	5.97	5.965	5.975	4.90
Bars, C.R., Pittsburgh	7.65*	7.65*	7.65*	7.65*	5.90
Shapes, Std., Pittsburgh	5.50	5.50	5.50	5.50	4.60
Shapes, Std., Chicago	5.50	5.50	5.50	5.50	4.60
Shapes, deld., Philadelphia	5.745	5.745	5.74	5.77	4.88
Plates, Pittsburgh	5.30	5.30	5.30	5.30	4.50
Plates, Chicago	5.30	5.30	5.30	5.30	4.50
Plates, Coatesville, Pa.	5.30	5.30	5.30	5.30	4.80
Plates, Sparrows Point, Md.	5.30	5.30	5.30	5.30	4.50
Plates, Claymont, Del.	5.30	5.30	5.30	5.30	4.80
Sheets, H.R., Pittsburgh	5.10	5.10	5.10	5.10	4.325
Sheets, H.R., Chicago	5.10	5.10	5.10	5.10	4.325
Sheets, C.R., Pittsburgh	6.275	6.275	6.275	6.275	5.325
Sheets, C.R., Chicago	6.275	6.275	6.275	6.275	5.325
Sheets, C.R., Detroit	6.275	6.275	6.275	6.275	5.325-5.425
Sheets, Galv., Pittsburgh	6.875	6.875	6.875	6.875	5.85
Strip, H.R., Pittsburgh	5.10	5.10	5.10	5.10	4.325
Strip, H.R., Chicago	5.10	5.10	5.10	5.10	4.325
Strip, C.R., Pittsburgh	7.425	7.425	7.425	7.425	6.25
Strip, C.R., Chicago	7.425	7.425	7.425	7.425	6.35
Strip, C.R., Detroit	7.425	7.425	7.425	7.425	6.35
Wire, Basic, Pittsburgh	8.00	8.00	8.00	8.00	6.25
Nails, Wire, nonstock, Pitts.	8.95	8.95	8.95	8.95	7.60
Tin Plate (1.50 lb) box, Pitts.	$10.65	$10.65	$10.65	$10.65	$9.45

*Including 0.35c for special quality.

SEMIFINISHED STEEL

Billets, forging, Pitts. (NT)	$99.50	$99.50	$99.50	$99.50	$84.50
Wire rods, 1/4-5/8" Pitts.	6.40	6.40	6.40	6.40	5.025

PIG IRON, Gross Ton

	Nov. 2 1960	Week Ago	Month Ago	Year Ago	5 Yr Ago
Bessemer, Pittsburgh	$67.00	$67.00	$67.00	$67.00	$59.50
Basic, Valley	66.00	66.00	66.00	66.00	58.50
Basic, deld., Philadelphia	70.18	70.18	70.07	70.41	62.16
No. 2 Fdry, NevilleIsland, Pa.	66.50	66.50	66.50	66.50	59.00
No. 2 Fdry, Chicago	66.50	66.50	66.50	66.50	59.00
No. 2 Fdry, deld., Phila.	70.68	70.68	70.57	70.91	62.66
No. 2 Fdry, Birmingham	62.50	62.50	62.50	62.50	55.00
No. 2 Fdry (Birm.), deld., Cin.	70.20	70.20	70.20	70.20	62.70
Malleable, Valley	66.50	66.50	66.50	66.50	59.00
Malleable, Chicago	66.50	66.50	66.50	66.50	59.00
Ferromanganese, net tonst	245.00	245.00	245.00	245.00	190.00

†74-76% Mn, Duquesne, Pa.

SCRAP, Gross Ton (Including broker's commission)

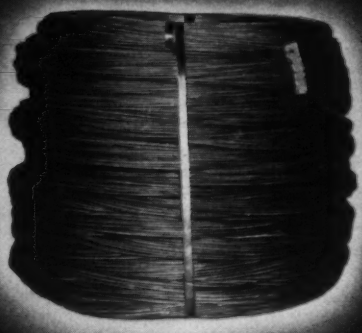
No. 1 Heavy Melt, Pittsburgh	$26.50	$28.50	$28.50	$45.50	$44.50
No. 1 Heavy Melt, E. Pa.	34.00	34.00	35.00	45.00	46.50
No. 1 Heavy Melt, Chicago	26.50	28.00	28.50	45.50	44.50
No. 1 Heavy Melt, Valley	26.50	27.50	30.50	44.50	48.00
No. 1 Heavy Melt, Cleve.	23.50	25.50	28.50	41.50	45.50
No. 1 Heavy Melt, Buffalo	25.50	27.50	27.50	33.50	43.50
Rails, Rerolling, Chicago	46.50	46.50	52.50	64.50	65.50
No. 1 Cast, Chicago	36.50	36.50	38.50	57.50	47.50

COKE, Net Ton

Beehive, Furn., Connlsvl.	$15.00	$15.00	$15.00	$15.00	$13.625
Beehive, Fdry., Connlsvl.	18.25	18.25	18.25	18.25	16.50
Oven, Fdry., Milwaukee	32.00	32.00	32.00	32.00	26.25

THE BEST WIRE FOR FASTER OUTPUT...

comes in Continental's cost-saving packages



why go "local" when you can take an "express"!

LEVERPAK, the modern drum container for 12 gauge through 24 gauge, where wire must be kept clean and dry . . . and safe from handling damage. Provides long uninterrupted runs. (Finer gages than above also possible for Leverpak, on inquiry.)

Econo-Coil® Reel unwinds 1500# to 2500# *nonstop*, depending on finish and gage . . . the single length wire that slashes stop-and-go coil changing time, and cuts scrap loss as much as 90 percent! Econo-Coils® are shipped on returnable reels which stack for easy handling when full, or nest when empty to save space.

Econo-Coil® *Reel-less*—If you prefer you can specify Econo-Coils® individually bundled and strapped without reels.

Econo-Coils® can be furnished in a wide range of gages, in many finishes, tempers, and analyses of low and medium low carbon steels. Let us show you how we have helped others speed output and cut production costs . . . with Econo-Coil.®

Wire specialists for over half a century

CONTINENTAL STEEL

CORPORATION KOKOMO, INDIANA

PRODUCERS OF: Manufacturer's Wire in many sizes, tempers, and finishes, including Galvanized, KOKOTE, Flame Sealed, Coppered, Tinned, Annealed, Liquor-Finished, Bright and special shaped wire. Also Welded Wire Reinforcing and Galvanized Fabric, Nails, Continental Chain Link Fence, and other products.

Steel Prices

Mill prices as reported to STEEL, Nov. 2, cents per pound except as otherwise noted. *Changes shown in italics.* Code number following mill point indicates producing company. Key to producers, page 150; footnotes, page 152.

SEMIFINISHED

INGOTS, Carbon, Forging (NT)
Munhall,Pa. U5 ..... $76.00

INGOTS, Alloy (NT)
Detroit S41 ..... $82.00
Economy,Pa. B14 ..... 82.00
Farrell,Pa. S3 ..... 82.00
Lowellville,O. S3 ..... 82.00
Midland,Pa. C18 ..... 82.00
Munhall,Pa. U5 ..... 82.00
Sharon,Pa. S3 ..... 82.00

BILLETS, BLOOMS & SLABS
Carbon Rerolling (NT)
Bartonville,Ill. K4 .... $82.00
Bessemer,Pa. U5 ..... 80.00
Buffalo R2 ..... 80.00
Clairton,Pa. U5 ..... 80.00
Ensley,Ala. T2 ..... 80.00
Fairfield,Ala. T2 ..... 80.00
Fontana,Calif. K1 .... 90.50
Gary,Ind. U5 ..... 80.00
Johnstown,Pa. B2 .... 80.00
Lackawanna,N.Y. B2 .. 80.00
Munhall,Pa. U5 ..... 80.00
Owensboro,Ky. G8 .... 80.00
S.Chicago,Ill. R2, U5 .. 80.00
S.Duquesne,Pa. U5 .... 80.00
Sterling,Ill. N15 ..... 80.00
Youngstown R2 ..... 80.00

Carbon, Forging (NT)
Bessemer,Pa. U5 .... $99.50
Buffalo R2 ..... 99.50
Canton,O. R2 ..... 102.00
Clairton,Pa. U5 ..... 99.50
Conshohocken,Pa. A3 .. 104.50
Ensley,Ala T2 ..... 99.50
Fairfield,Ala. T2 ..... 99.50
Farrell,Pa. S3 ..... 99.50
Fontana,Calif. K1 .... 109.00
Gary,Ind. U5 ..... 99.50
Geneva,Utah C11 ..... 99.50
Houston S5 ..... 104.50
Johnstown,Pa. B2 .... 99.50
Lackawanna,N.Y. B2 .. 99.50
LosAngeles B3 ..... 109.00
Midland,Pa. C18 ..... 99.50
Munhall,Pa. U5 ..... 99.50
Owensboro,Ky. G8 .... 99.50
Seattle B3 ..... 109.00
Sharon,Pa. S3 ..... 99.50
S.Chicago R2, U5, W14 .. 99.50
S.Duquesne,Pa. U5 .. 99.50
S.SanFrancisco B3 .... 109.00
Warren,O. C17 ..... 99.50

Alloy, Forging (NT)
Bethlehem,Pa. B2 .. $119.00
Bridgeport,Conn. C32 .. 119.00
Buffalo R2 ..... 119.00
Canton,O. R2, T7 ..... 119.00
Conshohocken,Pa. A3 .. 126.00
Detroit S41 ..... 119.00
Economy,Pa. B14 ..... 119.00
Farrell,Pa. S3 ..... 119.00
Fontana,Calif. K1 ..... 140.00
Gary,Ind. U5 ..... 119.00
Houston S5 ..... 124.00
Ind.Harbor,Ind. Y1 .... 119.00
Johnstown,Pa. B2 .... 119.00
Lackawanna,N.Y. B2 .. 119.00
LosAngeles B3 ..... 139.00
Lowellville,O. S3 ..... 119.00
Massillon,O. R2 ..... 119.00
Midland,Pa. C18 ..... 119.00
Munhall,Pa. U5 ..... 119.00
Owensboro,Ky. G8 .... 119.00
Seattle(6) B3 ..... 140.00
Sharon,Pa. S3 ..... 119.00
S.Chicago R2,U5,W14 .. 119.00
S.Duquesne,Pa. U5 .... 119.00
Struthers,O. Y1 .... 119.00
Warren,O. C17 ..... 119.00

ROUNDS, SEAMLESS TUBE (NT)
Buffalo R2 ..... $122.50
Canton,O. R2 ..... 125.00
Cleveland R2 ..... 122.50
Gary,Ind. U5 ..... 122.50
S.Chicago,Ill. R2,W14 .. 122.50
S.Duquesne,Pa. U5 .... 122.50
Warren,O. C17 ..... 122.50

SKELP
Aliquippa,Pa. J5 ..... 5.05
Benwood,W.Va. W10 .... 5.05
Ind.Harbor,Ind. Y1 .... 5.05
Munhall,Pa. U5 ..... 5.05
Pittsburgh J5 ..... 5.05
Warren,O. R2 ..... 5.05
Youngstown R2, U5 .... 5.05

WIRE RODS
AlabamaCity,Ala. R2 .. 6.40
Aliquippa,Pa. J5 ..... 6.40
Alton,Ill. L1 ..... 6.60
Bartonville,Ill. K4 ..... 6.50
Buffalo W12 ..... 6.40
Cleveland A7 ..... 6.40
Donora,Pa. A7 ..... 6.40
Fairfield,Ala. T2 ..... 6.40
Houston S5 ..... 6.65
IndianaHarbor,Ind. Y1 .. 6.40
Johnstown,Pa. B2 ..... 6.40
Joliet,Ill. A7 ..... 6.40
KansasCity,Mo. S5 .... 6.65
Kokomo,Ind. C16 ..... 6.50
LosAngeles B3 ..... 7.20
Minnequa,Colo. C10 .... 6.65
Monessen,Pa. P7 ..... 6.40
Pittsburg,Calif. C11 .... 7.20
Portsmouth,O. P12 .... 6.40
Roebling,N.J. R5 ..... 6.50
S.Chicago,Ill. R2, W14 .. 6.40
SparrowsPoint,Md. B2 .. 6.50
Sterling,Ill.(1) N15 .... 6.40
Sterling,Ill. N15 ..... 6.50
Struthers,O. Y1 ..... 6.40
Worcester,Mass. A7 .... 6.70

STRUCTURALS

Carbon Steel Std. Shapes
AlabamaCity,Ala. R2 ... 5.50
Aliquippa,Pa. J5 ..... 5.50
Atlanta A11 ..... 5.70
Bessemer,Ala. T2 ..... 5.50
Bethlehem,Pa. B2 ..... 5.55
Birmingham C15 ..... 5.50
Clairton,Pa. U5 ..... 5.50
Fairfield,Ala. T2 ..... 5.50
Fontana,Calif. K1 ..... 6.30
Gary,Ind. U5 ..... 5.50
Geneva,Utah C11 ..... 5.50
Houston S5 ..... 5.60
Ind.Harbor,Ind I-2, Y1 .. 5.50
Johnstown,Pa. B2 ..... 5.55
Joliet,Ill. P22 ..... 5.50
KansasCity,Mo. S5 .... 5.60
Lackawanna,N.Y. B2 .. 5.55
LosAngeles B3 ..... 6.20
Minnequa,Colo. C10 .... 5.80
Munhall,Pa. U5 ..... 5.50
Niles,Calif. P1 ..... 6.25
Phoenixville,Pa. P4 .... 5.55
Portland,Oreg. O4 ..... 6.25
Seattle B3 ..... 6.25
S.Chicago,Ill. U5, W14 .. 5.50
S.SanFrancisco B3 .... 6.15
Sterling,Ill. N15 ..... 5.50
Torrance,Calif. C11 .... 6.20
Weirton,W.Va. W6 .... 5.50

Wide Flange
Bethlehem,Pa. B2 ..... 5.55
Clairton,Pa. U5 ..... 5.50
Fontana,Calif. K1 ..... 6.45
IndianaHarbor,Ind. I-2 .. 5.50
Lackawanna,N.Y. B2 .. 5.55
Munhall,Pa. U5 ..... 5.50
Phoenixville,Pa. P4 .... 5.55
S.Chicago,Ill. U5 ..... 5.50
Sterling,Ill. N15 ..... 5.50
Weirton,W.Va. W6 .... 5.50

Alloy Std. Shapes
Aliquippa,Pa. J5 ..... 6.80
Clairton,Pa. U5 ..... 6.80
Gary,Ind. U5 ..... 6.80
Houston S5 ..... 6.90
Munhall,Pa. U5 ..... 6.80
S.Chicago,Ill. U5, W14 .. 6.80

H.S., L.A., Std. Shapes
Aliquippa,Pa. J5 ..... 8.05
Bessemer,Ala T2 ..... 8.05
Bethlehem,Pa. B2 ..... 8.10
Clairton,Pa. U5 ..... 8.05
Fairfield,Ala. T2 ..... 8.05
Fontana,Calif. K1 ..... 8.85
Gary,Ind. U5 ..... 8.05
Geneva,Utah C11 ..... 8.05
Houston S5 ..... 8.15
Ind.Harbor,Ind. I-2, Y1 .. 8.05
Johnstown,Pa. B2 ..... 8.10
KansasCity,Mo. S5 .... 8.15
Lackawanna,N.Y. B2 .. 8.10
LosAngeles B3 ..... 8.75
Munhall,Pa. U5 ..... 8.05
Seattle B3 ..... 8.80
S.Chicago,Ill. U5, W14 .. 8.05
S.SanFrancisco B3 .... 8.70
Sterling,Ill. N15 ..... 7.75
Struthers,O. Y1 ..... 8.05

H.S., L.A., Wide Flange
Bethlehem,Pa. B2 ..... 8.10
Ind Harbor,Ind. I-2 .... 8.05
Lackawanna,N.Y. B2 .. 8.10
Munhall,Pa. U5 ..... 8.05
S.Chicago,Ill. U5 ..... 8.05
Sterling,Ill. N15 ..... 7.75

PILING

BEARING PILES
Bethlehem,Pa. B2 .... 5.55
Ind.Harbor,Ind. I-2 .... 5.50
Lackawanna,N.Y. B2 .. 5.55
Munhall,Pa. U5 ..... 5.50
S.Chicago,Ill. I-2, U5 .. 5.50

STEEL SHEET PILING
Ind.Harbor,Ind. I-2 .... 6.50
Lackawanna,N.Y. B2 .. 6.50
Munhall,Pa. U5 ..... 6.50
S.Chicago,Ill. I-2, U5 .. 6.50
Weirton,W.Va. W6 .... 6.50

PLATES

PLATES, Carbon Steel
AlabamaCity,Ala. R2 .. 5.30
Aliquippa,Pa. J5 ..... 5.30
Ashland,Ky.(15) A10 ... 5.30
Atlanta A11 ..... 5.50
Bessemer,Ala. T2 ..... 5.30
Clairton,Pa. U5 ..... 5.30
Claymont,Del. P4 ..... 5.30
Cleveland J5, R2 ..... 5.30
Coatesville,Pa. L7 .... 5.30
Conshohocken,Pa. A3 .. 5.30
Ecorse,Mich. G5 ..... 5.30
Fairfield,Ala. T2 ..... 5.30
Farrell,Pa. S3 ..... 5.30
Fontana,Calif.(30) K1 .. 6.10
Gary,Ind. U5 ..... 5.30
Geneva,Utah C11 ..... 5.30
GraniteCity,Ill. G4 .... 5.40
Harrisburg,Pa. P4 .... 5.30
Houston S5 ..... 5.40
Ind.Harbor,Ind. I-2, Y1 .. 5.30
Johnstown,Pa. B2 ..... 5.30
Lackawanna,N.Y. B2 .. 5.30
Mansfield,O. E6 ..... 5.30
Minnequa,Colo. C10 .... 6.15
Munhall,Pa. U5 ..... 5.30
Newport,Ky. A2 ..... 5.30
Pittsburgh J5 ..... 5.30
Riverdale,Ill. A1 ..... 5.30
Seattle B3 ..... 6.20
Sharon,Pa. S3 ..... 5.30
S.Chicago,Ill. U5, W14 .. 5.30
SparrowsPoint,Md. B2 .. 5.30
Sterling,Ill. N15 ..... 5.30
Steubenville,O. W10 .... 5.30
Warren,O. R2 ..... 5.30
Youngstown U5, Y1 .... 5.30
Youngstown(27) R2 .... 5.30

PLATES, Carbon Abres. Resist.
Claymont,Del. P4 ..... 7.05
Fontana,Calif. K1 ..... 7.85
Geneva,Utah C11 ..... 7.05
Houston S5 ..... 7.15
Johnstown,Pa. B2 .... 7.05
SparrowsPoint,Md. B2 .. 7.05

PLATES, Wrought Iron
Economy,Pa. B14 ..... 14.10

PLATES, H.S., L.A.
Aliquippa,Pa. J5 ..... 7.95
Ashland,Ky. A10 ..... 7.95
Bessemer,Ala. T2 ..... 7.95
Clairton,Pa. U5 ..... 7.95
Claymont,Del. P4 ..... 7.95
Cleveland J5, R2 ..... 7.95
Coatesville,Pa. L7 .... 7.95
Conshohocken,Pa. A3 .. 7.95
Economy,Pa. B14 ..... 7.95
Ecorse,Mich. G5 ..... 7.95
Fairfield,Ala. T2 ..... 7.95
Farrell,Pa. S3 ..... 7.95
Fontana,Calif.(30) K1 .. 8.75
Gary,Ind. U5 ..... 7.95
Geneva,Utah C11 ..... 7.95
Houston S5 ..... 8.05
Ind.Harbor,Ind. I-2, Y1 .. 7.95
Johnstown,Pa. B2 ..... 7.95
Munhall,Pa. U5 ..... 7.95
Pittsburgh J5 ..... 7.95
Seattle B3 ..... 8.85
Sharon,Pa. S3 ..... 7.95
S.Chicago,Ill. U5, W14 .. 7.95
SparrowsPoint,Md. B2 .. 7.95
Sterling,Ill. N15 ..... 7.625
Warren,O. R2 ..... 7.95
Youngstown U5, Y1 .... 7.95

PLATES, Alloy
Aliquippa,Pa. J5 ..... 7.50
Claymont,Del. P4 ..... 7.50
Coatesville,Pa. L7 .... 7.50
Economy,Pa. B14 ..... 7.50
Farrell,Pa. S3 ..... 7.50
Fontana,Calif. K1 ..... 8.30
Gary,Ind. U5 ..... 7.50
Houston S5 ..... 7.60
Ind.Harbor,Ind. Y1 .... 7.50
Johnstown,Pa. B2 ..... 7.50
Lowellville,O. S3 ..... 7.50
Munhall,Pa. U5 ..... 7.50
Newport,Pa. A2 ..... 7.50
Pittsburgh J5 ..... 7.50
Seattle B3 ..... 8.40
Sharon,Pa. S3 ..... 7.50
S.Chicago,Ill. U5, W14 .. 7.50
SparrowsPoint,Md. B2 .. 7.50
Youngstown Y1 ..... 7.50

FLOOR PLATES
Cleveland J5 ..... 6.375
Claymont,Del. P4 .... 6.375
Conshohocken,Pa. A3 .. 6.375
Ind.Harbor,Ind. I-2 .... 6.375
Munhall,Pa. U5 ..... 6.375
Pittsburgh J5 ..... 6.375
S.Chicago,Ill. U5 .... 6.375

PLATES, Ingot Iron
Ashland c.l.(15) A10 ... 5.55
Ashland l.c.l.(15) A10 .. 6.05
Cleveland c.l. R2 .... 6.05
Warren,O. R2 ..... 6.05

BARS

BARS, Hot-Rolled Carbon
(Merchant Quality)
Ala.City,Ala.(9) R2 ... 5.675
Aliquippa,Pa.(9) J5 ... 5.675
Alton,Ill. L1 ..... 5.875
Atlanta(9) A11 ..... 5.875
Bessemer,Ala.(9) T2 .. 5.675
Birmingham(9) C15 ... 5.675
Buffalo(9) R2 ..... 5.675
Canton,O.(23) R2 ..... 6.15
Clairton,Pa.(9) U5 .... 5.675
Cleveland(9) R2 ..... 5.675
Ecorse,Mich.(9) G5 .... 5.675
Emeryville,Calif. J7 .. 6.425
Fairfield,Ala.(9) T2 .. 5.675
Fairless,Pa.(9) U5 .... 5.825
Fontana,Calif.(9) K1 .. 6.375
Gary,Ind.(9) U5 ..... 5.675
Houston(9) S5 ..... 5.925
Ind.Harbor(9) I-2, Y1 .. 5.675
Johnstown,Pa.(9) B2 .. 5.675
Joliet,Ill. P2 ..... 5.675
KansasCity,Mo.(9) S5 .. 5.925
Lackawanna(9) B2 .... 5.675
LosAngeles(9) B3 .... 6.375
Massillon,O.(23) R2 .... 6.15
Midland,Pa.(23) C18 .. 6.025
Milton,Pa. M18 ..... 5.825
Minnequa,Colo. C10 .... 6.125
Niles,Calif. P1 ..... 6.375
Owensboro,Ky.(9) G8 .. 6.025
Pittsburg,Calif.(9) C11 .. 6.375
Pittsburgh(9) J5 ..... 5.675
Portland,Oreg. O4 ..... 6.425
Riverdale,Ill.(9) A1 ... 5.675
Seattle(9) A24,B3,N15 .. 6.425
S.Ch'c'go(9)R2,U5,W14 5.675
S.Duquesne,Pa.(9) U5 .. 5.675
S.SanFran.,Calif.(9)B3 6.425
Sterling,Ill.(1)(9) N15 .. 5.675
Sterling,Ill.(9) N15 .... 5.775
Struthers,O.(9) Y1 .... 5.675
Tonawanda,N.Y. B12 .... 5.675
Torrance,Calif.(9) C11 .. 6.375
Warren,O. C17 ..... 6.025
Youngstown(9) R2,U5 .. 5.675

BARS, Hot-Rolled Alloy
Aliquippa,Pa. J5 ..... 6.725
Bethlehem,Pa. B2 ..... 6.725
Bridgeport,Conn. C32 .. 6.80
Buffalo R2 ..... 6.725
Canton,O. R2, T7 ..... 6.725
Clairton,Pa. U5 ..... 6.725
Detroit S41 ..... 6.725
Economy,Pa. B14 ..... 6.725
Ecorse,Mich. G5 ..... 6.725
Fairless,Pa. U5 ..... 6.875
Farrell,Pa. S3 ..... 6.725
Fontana,Calif. K1 ..... 7.775
Gary,Ind. U5 ..... 6.725
Houston S5 ..... 6.975
Ind.Harbor,Ind. I-2, Y1 6.725
Johnstown,Pa. B2 .... 6.725
KansasCity,Mo. S5 .... 6.975
Lackawanna,N.Y. B2 .. 6.725
LosAngeles B3 ..... 7.775
Lowellville,O. S3 ..... 6.725
Massillon,O. R2 ..... 6.725
Midland,Pa. C18 ..... 6.725
Owensboro,Ky. G8 .... 6.725
Pittsburgh J5 ..... 6.725
Seattle(6) B3 ..... 7.825
Sharon,Pa. S3 ..... 6.725
S.Chicago R2, U5, W14 .. 6.725
S.Duquesne,Pa. U5 .... 6.725
Struthers,O. Y1 ..... 6.725
Warren,O. C17 ..... 6.725
Youngstown U5 ..... 6.725

BARS & SMALL SHAPES, H.R.
High-Strength, Low-Alloy
Aliquippa,Pa. J5 ..... 8.30
Bessemer,Ala. T2 ..... 8.30
Bethlehem,Pa. B2 ..... 8.30
Clairton,Pa. U5 ..... 8.30
Cleveland R2 ..... 8.30
Ecorse,Mich. G5 ..... 8.30
Fairfield,Ala. T2 ..... 8.30
Fontana,Calif. K1 ..... 9.00
Gary,Ind. U5 ..... 8.30
Houston S5 ..... 8.55
Ind.Harbor,Ind. Y1 .... 8.30
Johnstown,Pa. B2 ..... 8.30
KansasCity,Mo. S5 .... 8.55
Lackawanna,N.Y. B2 .. 8.30
LosAngeles B3 ..... 9.00
Pittsburgh J5 ..... 8.30
Seattle B3 ..... 9.05
S.Chicago,Ill. R2, W14 .. 8.30
S.Duquesne,Pa. U5 .... 8.30
S.SanFrancisco B3 .... 9.05
Sterling,Ill. N15 ..... 7.925
Struthers,O. Y1 ..... 8.30
Youngstown U5 ..... 8.30

BAR SIZE ANGLES; H.R. Carbon
Bethlehem,Pa.(9) B2 .. 5.825
Houston(9) S5 ..... 5.925
KansasCity,Mo.(9) S5 .. 5.925
Lackawanna(9) B2 .... 5.675
Sterling,Ill. N15 ..... 5.775
Sterling,Ill.(1) N15 .... 5.675
Tonawanda,N.Y. B12 .. 5.675

BAR SIZE ANGLES; S. SHAPES
Aliquippa,Pa. J5 ..... 5.675
Atlanta A11 ..... 5.875
Joliet,Ill. P22 ..... 5.675
Minnequa,Colo. C10 .... 6.125
Niles,Calif. P1 ..... 6.375
Pittsburgh J5 ..... 5.675
Portland,Oreg. O4 .... 6.425
SanFrancisco S7 ..... 6.52
Seattle B3 ..... 6.425

BAR SIZE ANGLES; S. SHAPES
Wrought Iron
Economy,Pa. B14 ..... 16.45

BAR SHAPES, Hot-Rolled Alloy
Aliquippa,Pa. J5 ..... 6.80
Clairton,Pa. U5 ..... 6.80
Gary,Ind. U5 ..... 6.80
Houston S5 ..... 7.05
KansasCity,Mo. S5 .... 7.05
Pittsburgh J5 ..... 6.80
Youngstown U5 ..... 6.80

BARS, C.F. Loaded
(Including loaded extra)
Carbon
LosAngeles P2 , S30 .. 11.75*

Alloy
Ambridge,Pa. W18 .. 10.175
BeaverFalls,Pa. M12 .. 10.175
Camden,N.J. P13 ..... 10.35
Chicago W18 ..... 10.175
Elyria,O. W8 ..... 10.175
Monaca,Pa. S17 ..... 10.175
Newark,N.J. W18 .... 10.35
SpringCity,Pa. K3 ..... 10.35

*Grade A; add 0.5c for Grade B.

BARS, Cold-Finished Carbon
Ambridge,Pa. W18 ..... 7.65
BeaverFalls,Pa. M12,R2 .. 7.65
Birmingham C15 ..... 8.25
Buffalo B5 ..... 7.70
Camden,N.J. P13 ..... 8.10
Carnegie,Pa. C12 ..... 7.65
Chicago W18 ..... 7.65
Cleveland A7, C20 ..... 7.65
Detroit B5, P17 ..... 7.85
Detroit S41 ..... 7.65
Donora,Pa. A7 ..... 7.65
Elyria,O. W8 ..... 7.65
FranklinPark,Ill. N5 .... 7.65
Gary,Ind. R2 ..... 7.65
GreenBay,Wis. F7 .... 7.65
Hammond,Ind. J5, L2 .. 7.65
Hartford,Conn. R2 .... 8.15
Harvey,Ill. B5 ..... 7.65
LosAngeles(49) S30 .... 9.10
LosAngeles(49) P2, R2 .. 9.10
Mansfield,Mass. B5 .... 8.20
Massillon,O. R2, R8 .... 7.65
Midland,Pa. C18 ..... 7.65
Monaca,Pa. S17 ..... 7.65
Newark,N.J. W18 ..... 8.10
NewCastle,Pa.(17) B4 .. 7.65
Pittsburgh J5 ..... 7.65
Plymouth,Mich. P5 .... 7.90
Putnam,Conn. W18 .... 8.20
Readville,Mass. C14 .... 8.20
Seattle(49) S30 ..... 9.10
S.Chicago,Ill. W14 .... 7.65
SpringCity,Pa. K3 .... 8.10
Struthers,O. Y1 ..... 7.65
Warren,O. C17 ..... 7.65
Waukegan,Ill. A7 ..... 7.65
Willimantic,Conn. J5 .... 8.15
Youngstown F3, Y1 .... 7.65

BARS, Cold-Finished Carbon
(Turned and Ground)
Cumberland,Md.(5) C19 .. 6.55

BARS, Cold-Finished Alloy
Ambridge,Pa. W18 .... 9.025
BeaverFalls,Pa. M12,R2 .. 9.025
Bethlehem,Pa. B2 .... 9.025
Bridgeport,Conn. C32 .. 9.175
Buffalo B5 ..... 9.025
Camden,N.J. P13 ..... 9.20
Canton,O. T7 ..... 9.025
Carnegie,Pa. C12 ..... 9.025
Chicago W18 ..... 9.025
Cleveland A7, C20 .... 9.025
Detroit B5, P17 ..... 9.225
Detroit S41 ..... 9.025
Donora,Pa. A7 ..... 9.025
Elyria,O. W8 ..... 9.025
FranklinPark,Ill. N5 .. 9.025
Gary,Ind. R2 ..... 9.025
GreenBay,Wis. F7 .... 9.025
Hammond,Ind. J5, L2 .. 9.025
Hartford,Conn. R2 .... 9.325
Harvey,Ill. R5 ..... 9.025
Lackawanna,N.Y. B3 .. 9.025
LosAngeles P2, S30 .... 11.00
Mansfield,Mass. B5 .... 9.325
Massillon,O. R2, R8 .... 9.025
Midland,Pa. C18 ..... 9.025
Monaca,Pa. S17 ..... 9.025
Newark,N.J. W18 ..... 9.20
Plymouth,Mich. P5 .... 9.225
S.Chicago,Ill. W14 .... 9.025
SpringCity,Pa. K3 .... 9.20
Struthers,O. Y1 ..... 9.025

Warren,O. C17 .....9.025
Waukegan,Ill. A7 ....9.025
Willimantic,Conn. J5 ..9.325
Worcester,Mass. A7 ...9.325
Youngstown F3, Y1 ...9.025

BARS, Reinforcing, Billet (To Fabricators)

AlabamaCity,Ala. R2 ..5.675
Atlanta A11 .....5.25
Birmingham C15 .....5.25
Buffalo R2 .....5.675
Cleveland R2 .....5.675
Ecorse,Mich. G5 .....5.675
Emeryville,Calif. J7 ...6.425
Fairfield,Ala. T2 .....5.675
Fairless,Pa. U5 .....5.825
Fontana,Calif. K1 ....6.375
Ft.Worth,Tex.(26) T4 ..5.50
Gary,Ind. U5 .....5.675
Houston S5 .....5.675
Ind.Harbor,Ind. I-2,Y1.5.675
Johnstown,Pa. B2 ....5.675
Joliet,Ill. P22 .....5.675
KansasCity,Mo. S5 ...5.675
Kokomo,Ind. C16 .....5.775
Lackawanna,N.Y. B2...5.675
LosAngeles B3 .....6.375
Madison,Ill. L1 .....5.875
Milton,Pa. M18 .....5.825
Minnequa,Colo. C10 ...6.125
Niles,Calif. P1 .....6.375
Pittsburg,Calif. C11 ...6.375
Pittsburgh J5 .....5.675
Portland,Oreg. O4 ....6.425
SandSprings,Okla. S5 ..5.675
Seattle A24, B3, N14 ..6.425
S.Chicago,Ill. R2, W14.5.675
S.Duquesne,Pa. U5 ....5.675
S.SanFrancisco B3 ....6.425
SparrowsPoint,Md. B2..5.675
Sterling,Ill.(1) N15 ...5.675
Sterling,Ill. N15 .....5.775
Struthers,O. Y1 .....5.675
Tonawanda,N.Y. B12 ..6.10
Torrance,Calif. C11 ...6.375
Youngstown R2, U5 ..5.675

BARS, Reinforcing, Billet (Fabricated: to Consumers)

Baltimore B2 .....7.42
Boston B2, U8 .....8.15
Chicago U8 .....7.41
Cleveland U8 .....7.39
Houston S5 .....7.35
Johnstown,Pa. B2 .....7.33
KansasCity,Mo. S5 ....7.35
Lackawanna,N.Y. B2 ..7.35
Marion,O. P11 .....6.70
Newark,N.J. U8 .....7.80
Philadelphia U8 .....7.63
Pittsburgh J5, U8 .....7.35
SandSprings,Okla. S5 ...7.35
Seattle A24, B3, N14 ..7.95
SparrowsPoint,Md. B2 ..7.33
St.Paul U8 .....8.17
Williamsport,Pa. S19 ..7.25

BARS, Wrought Iron

Economy,Pa.(S.R.)B14 15.10
Economy,Pa.(D.R.)B14 19.30
Econ.(DirectRolled)B14 13.55
Economy(Staybolt) B14 19.80
McK.Rks.(S.R.) L5 ...14.50
McK.Rks.(D.R.)L5 ...19.80
McK.Rks.(Staybolt)L5. 20.95

BARS, Rail Steel

ChicagoHts.(3) C2, I-2.5.575
ChicagoHts.(4)(44) I-2.5.675
ChicagoHts.(4) C2 ....5.675
Franklin,Pa.(3) F5 ....5.575
Franklin,Pa.(4) F5 ....5.675
JerseyShore,Pa.(3) J8 .5.55
Marion,O.(3) P11 ....5.575
Tonawanda(3) B12 ....5.575
Tonawanda(4) B12 ....6.10

SHEETS

SHEETS, Hot-Rolled Steel (18 Gage and Heavier)

AlabamaCity,Ala. R2 ..5.10
Allenport,Pa. P7 .....5.10
Aliquippa,Pa. J5 .....5.10
Ashland,Ky.(8) A10 ....5.10
Cleveland J5, R2 .....5.10
Conshohocken,Pa. A3, ..5.15
Detroit(8) M1 .....5.10
Ecorse,Mich. G5 .....5.10
Fairfield,Ala. T2 .....5.10
Fairless,Pa. U5 .....5.15
Farrell,Pa. S3 .....5.10
Fontana,Calif. K1 ....5.825
Gary,Ind. U5 .....5.10
Geneva,Utah C11 .....5.20
GraniteCity,Ill(8) G4 ..5.20
Ind.Harbor,Ind. I-2, Y1.5.10
Irvin,Pa. U5 .....5.10
Lackawanna,N.Y. B2 ..5.10
Mansfield,O. E6 .....5.10
Munhall,Pa. U5 .....5.10
Newport,Ky. A2 .....5.10
Niles,O. M21, S3 .....5.10
Pittsburg,Calif. C11 ....5.80
Pittsburgh J5 .....5.10
Portsmouth,O. P12 .....5.10
Riverdale,Ill. A1 .....5.10
Sharon,Pa. S3 .....5.10
S.Chicago,Ill. U5, W14..5.10
SparrowsPoint,Md. B2 ..5.10
Steubenville,O. W10 ....5.10
Warren,O. R2 .....5.10
Weirton,W.Va. W6 ....5.10
Youngstown U5, Y1 ....5.10

SHEETS, H.R. (19Ga. & Lighter)

Niles,O. M21, S3 ....6.275

SHEETS, H.R. Alloy

Gary,Ind. U5 .....8.40
Ind.Harbor,Ind. Y1 ....8.40
Irvin,Pa. U5 .....8.40
Munhall,Pa. U5 .....8.40
Newport,Ky. A2 .....8.40
Youngstown U5, Y1 ....8.40

SHEETS, H.R. (14 Ga. & Heavier) High-Strength, Low-Alloy

Aliquippa,Pa. J5 .....7.525
Ashland,Ky. A10 .....7.525
Cleveland J5, R2 .....7.525
Conshohocken,Pa. A3 ..7.575
Ecorse,Mich. G5 .....7.525
Fairfield,Ala. T2 .....7.525
Fairless,Pa. U5 .....7.575
Farrell,Pa. S3 .....7.525
Fontana,Calif. K1 .....8.25
Gary,Ind. U5 .....7.525
Ind.Harbor,Ind. I-2, Y1 7.525
Irvin,Pa. U5 .....7.525
Lackawanna(35) B2 ...7.525
Munhall,Pa. U5 .....7.525
Niles,O. S3 .....7.525
Pittsburgh J5 .....7.525
S.Chicago,Ill. U5, W14.7.525
Sharon,Pa. S3 .....7.525
SparrowsPoint(36) B2..7.525
Warren,O. R2 .....7.525
Weirton,W.Va. W6 ....7.525
Youngstown U5, Y1 ...7.525

SHEETS, Hot-Rolled Ingot Iron (18 Gage and Heavier)

Ashland,Ky.(8) A10 ...5.35
Cleveland R2 .....5.875
Warren,O. R2 .....5.875

SHEETS, Cold-Rolled Ingot Iron

Cleveland R2 .....7.05
Middletown,O. A10 ....6.775
Warren,O. R2 .....7.05

SHEETS, Cold-Rolled Steel (Commercial Quality)

AlabamaCity,Ala. R2 ..6.275
Aliquippa,Pa. J5 .....6.275
Allenport,Pa. P7 .....6.275
Cleveland J5, R2 .....6.275
Conshohocken,Pa. A3 ..6.325
Detroit M1 .....6.275
Ecorse,Mich. G5 .....6.275
Fairfield,Ala. T2 .....6.275
Fairless,Pa. U5 .....6.325
Follansbee,W.Va. F4 ..6.275
Fontana,Calif. K1 .....7.40
Gary,Ind. U5 .....6.275
GraniteCity,Ill. G4 ....6.375
Ind.Harbor,Ind. I-2, Y1 6.275
Irvin,Pa. U5 .....6.275
Lackawanna,N.Y. B2 ..6.275
Mansfield,O. E6 .....6.275
Middletown,O. A10 ....6.275
Newport,Ky. A2 ....6.275
Pittsburg,Calif. C11 ...7.225
Pittsburgh J5 .....6.275
Portsmouth,O. P12 ....6.275
SparrowsPoint,Md. B2..6.275
Steubenville,O. W10 ...6.275
Warren,O. R2 .....6.275
Weirton,W.Va. W6 ....6.275
Yorkville,O. W10 .....6.275
Youngstown Y1 .....6.275

SHEETS, Cold-Rolled, High-Strength, Low-Alloy

Aliquippa,Pa. J5 .....9.275
Cleveland J5, R2 .....9.275
Ecorse,Mich. G5 .....9.275
Fairless,Pa. U5 .....9.325
Fontana,Calif. K1 ....10.40
Gary,Ind. U5 .....9.275
Ind.Harbor,Ind. I-2, Y1 9.275
Lackawanna(38) B2 ..9.275
Pittsburgh J5 .....9.275
SparrowsPoint(33) B2..9.275
Warren,O. R2 .....9.275
Weirton,W.Va. W6 ....9.275
Youngstown Y1 .....9.275

SHEETS, Culvert	Cu Steel	Cu Fe
Ala.City,Ala. R2	7.225	....
Ashland,Ky. A10	7.225	7.475
Canton,O. R2	7.225	....
Fairfield,Ala. T2	7.225	7.475
Gary,Ind. U5	7.225	7.475
GraniteCity,Ill.G4	7.325	....
Ind.Harbor I-2	7.225	7.475
Irvin,Pa. U5	7.225	7.475
Kokomo,Ind. C16	7.325	....
MartinsFry. W10	7.225	7.475
Pitts.,Calif. C11	7.975	....
Pittsburgh J5	7.225	....
SparrowsPt. B2	7.225	....

SHEETS, Culvert—Pure Iron

Ind.Harbor,Ind. I-2 ....7.475

SHEETS, Enameling

Ashland,Ky. A10 .....6.775
Cleveland R2 .....6.775
Fairfield,Ala. T2 .....6.775
Gary,Ind. U5 .....6.775
Ind.Harbor,Ind. I-2, Y1 6.775
Irvin,Pa. U5 .....6.775
Middletown,O. A10 ....6.775
Niles,O. M21, S3 ....6.775
SparrowsPoint,Md. B2..6.775
Youngstown Y1 .....6.775

BLUED STOCK, 29 Gage

Dover,O. E6 .....8.70
Ind.Harbor,Ind. I-2 ....8.70
Mansfield,O. E6 .....8.70
Warren,O. R2 .....8.70
Yorkville,O. W10 .....8.70

SHEETS, Long Terne, Steel (Commercial Quality)

Follansbee,W.Va. W10 .7.225
Gary,Ind. U5 .....7.225
Mansfield,O. E6 .....7.225
Middletown,O. A10 ...7.225
Niles,O. M21, S3 .....7.225
Warren,O. R2 .....7.225

SHEETS, Long Terne, Ingot Iron

Middletown,O. A10 ....7.625

SHEETS, Aluminum Coated

Butler,Pa. A10 (type 1) 9.525
Butler,Pa. A10 (type 2) 9.625
Irvin,Pa. U5 (type 1) ..9.525

SHEETS, Well Casing

Fontana,Calif. K1 .....7.325

SHEETS, Galvanized High-Strength, Low-Alloy

Irvin,Pa. U5 .....10.125
Pittsburgh J5 .....10.125
SparrowsPt.(39) B2 ..10.025

SHEETS, Galvannealed Steel

Canton,O. R2 .....7.275
Irvin,Pa. U5 .....7.275

SHEETS, Galvanized Ingot Iron (Hot-Dipped Continuous)

Ashland,Ky. A10 ....7.125
Middletown,O. A10 ....7.125

SHEETS, Electrogalvanized

Cleveland(28) R2 .....7.65
Niles,O.(28) R2 .....7.65
Weirton,W.Va. W6 ....7.50

SHEETS, Galvanized Steel Hot-Dipped

AlabamaCity,Ala. R2..6.875‡
Ashland,Ky. A10 ....6.875‡
Canton,O. R2 .....6.875‡
Dover,O. E6 .....6.875†
Fairfield,Ala. T2 ....6.875†
Gary,Ind. U5 .....6.875†
GraniteCity,Ill. G4 ...6.975*
Ind.Harbor,Ind. I-2 ..6.875†
Irvin,Pa. U5 .....6.875†
Kokomo,Ind. C16 ....6.975‡
MartinsFerry,O. W10..6.875*
Middletown,O. A10 ..6.875†
Pittsburg,Calif. C11 ..7.625*
Pittsburgh J5 .....6.875†
SparrowsPt.,Md. B2 ..6.875†
Warren,O. R2 .....6.875†
Weirton,W.Va. W6 ..6.875*

*Continuous and noncontinuous. †Continuous. ‡Noncontinuous.

Key to Producers

A1 Acme Steel Co.
A2 Acme-Newport Steel Co.
A3 Alan Wood Steel Co.
A4 Allegheny Ludlum Steel
A5 Alloy Metal Wire Div., H. K. Porter Co. Inc.
A6 American Shim Steel Co.
A7 American Steel & Wire Div., U. S. Steel Corp.
A8 Anchor Drawn Steel Co.
A9 Angell Nail & Chaplet
A10 Armco Steel Corp.
A11 Atlantic Steel Co.
A24 Alaska Steel Mills Inc.
A25 Algoma Steel Corp. Ltd.

B1 Babcock & Wilcox
B2 Bethlehem Steel Co.
B3 Bethlehem Steel Co., Pacific Coast Div.
B4 Blair Strip Steel Co.
B5 Bliss & Laughlin Inc.
B8 Braeburn Alloy Steel
B9 Brainard Steel Div., Sharon Steel Corp.
B10 E. & G. Brooke, Wickwire Spencer Steel Div., Colo. Fuel & Iron
B12 Buffalo Steel Corp.
B14 A. M. Byers Co.
B15 J. Bishop & Co.

C1 Calstrip Steel Corp.
C2 Calumet Steel Div., Borg-Warner Corp.
C4 Carpenter Steel Co.
C9 Colonial Steel Co.
C10 Colorado Fuel & Iron
C11 Columbia-Geneva Steel
C12 Columbia Steel & Shaft.
C13 Columbia Tool Steel Co.
C14 Compressed Steel Shaft.
C15 Connors Steel Div., H. K. Porter Co., Inc.
C16 Continental Steel Corp.
C17 Copperweld Steel Co.
C18 Crucible Steel Co.
C19 Cumberland Steel Co.
C20 Cuyahoga Steel & Wire
C23 Charter Wire Inc.
C24 G. O. Carlson Inc.
C32 Carpenter Steel of N.Eng.

D2 Detroit Steel Corp.
D4 Disston Div., H. K. Porter Co. Inc.
D6 Driver-Harris Co.
D7 Dickson Weatherproof Nail Co.
D8 Damascus Tube Co.
D9 Wilbur B. Driver Co.

E1 Eastern Gas&Fuel Assoc.
E2 Eastern Stainless Steel
E6 Empire-Reeves Steel
E10 Enamel Prod. & Plating

F2 Firth Sterling Inc.
F3 Fitzsimmons Steel Co.
F4 Follansbee Steel Corp.
F5 Franklin Steel Div., Borg-Warner Corp.
F6 Fretz-Moon Tube Co.
F7 Ft. Howard Steel & Wire
F8 Ft. Wayne Metals Inc.

G4 Granite City Steel Co.
G5 Great Lakes Steel Corp.
G6 Greer Steel Co.
G8 Green River Steel Corp.

H1 Hanna Furnace Corp.
H7 Helical Tube Co.

I-1 Igoe Bros. Inc.
I-2 Inland Steel Co.
I-3 Interlake Iron Corp.
I-4 Ingersoll Steel Div., Borg-Warner Corp.
I-6 Ivins Steel Tube Works
I-7 Indiana Steel & Wire Co.

J1 Jackson Iron & Steel Co.
J3 Jessop Steel Co.
J4 Johnson Steel & Wire Co.
J5 Jones & Laughlin Steel
J6 Joslyn Mfg. & Supply
J7 Judson Steel Corp.
J8 Jersey Shore Steel Co.

K1 Kaiser Steel Corp.
K2 Keokuk Electro-Metals
K3 Keystone Drawn Steel
K4 Keystone Steel & Wire
K7 Kenmore Metals Corp.

L1 Laclede Steel Co.
L2 LaSalle Steel Co.
L3 Latrobe Steel Co.
L6 Lone Star Steel Co.
L7 Lukens Steel Co.
L8 Leschen Wire Rope Div., H. K. Porter Co. Inc.

M1 McLouth Steel Corp.
M4 Mahoning Valley Steel
M6 Mercer Pipe Div., Sawhill Tubular Products
M8 Mid-States Steel & Wire
M12 Moltrup Steel Products
M14 McInnes Steel Co.
M16 Md. Fine & Specialty Wire Co. Inc.
M17 Metal Forming Corp.
M18 Milton Steel Div., Merritt-Chapman&Scott
M21 Mallory-Sharon Metals Corp.
M22 Mill Strip Products Co.
M23 Mill Strip Products Co. of Pennsylvania

N1 National-Standard Co.
N2 National Supply Co.
N3 National Tube Div., U. S. Steel Corp.
N5 Nelsen Steel & Wire Co.
N6 New England High Carbon Wire Co.
N8 Newman-Crosby Steel
N14 Northwest. Steel Rolling Mills Inc.
N15 Northwestern S.&W. Co.
N20 Neville Ferro Alloy Co.

O4 Oregon Steel Mills

P1 Pacific States Steel Corp.
P2 Pacific Tube Co.
P4 Phoenix Steel Corp.
P5 Pilgrim Drawn Steel
P6 Pittsburgh Coke&Chem.
P7 Pittsburgh Steel Co.
P11 Pollak Steel Co.
P12 Portsmouth Div., Detroit Steel Corp.
P13 Precision Drawn Steel
P15 Pittsburgh Metallurgical
P16 Page Steel & Wire Div., American Chain & Cable
P17 Plymouth Steel Corp.
P19 Pitts. Rolling Mills
P20 Prod. Steel Strip Corp.
P22 Phoenix Mfg. Co.
P24 Phil. Steel & Wire Corp.
R2 Republic Steel Corp.
R3 Rhode Island Steel Corp.
R5 Roebling's Sons, John A.
R6 Rome Strip Steel Co.
R8 Reliance Div.,EatonMfg.
R9 Rome Mfg. Co.
R10 Rodney Metals Inc.
S1 Seneca Wire & Mfg. Co.
S3 Sharon Steel Corp.
S4 Sharon Tube Co.
S5 Sheffield Div., Armco Steel Corp.
S6 Shenango Furnace Co.
S7 Simmons Co.
S8 Simonds Saw & Steel Co.
S12 Spencer Wire Corp.
S13 Standard Forgings Corp.
S14 Standard Tube Co.
S15 Stanley Works
S17 Superior Drawn Steel Co.
S18 Superior Steel Div., Copperweld Steel Co.
S19 Sweet's Steel Co.
S20 Southern States Steel
S23 Superior Tube Co.
S25 Stainless Welded Prod.
S26 Specialty Wire Co. Inc.
S30 Sierra Drawn Steel Div., Bliss & Laughlin Inc.
S40 Seneca Steel Service
S41 Stainless & Strip Div., J & L Steel Corp.
S42 Southern Elec. Steel Co.
S43 Seymour Mfg. Co.
S44 Screw & Bolt Corp. of America
S45 Somers Brass Co.
S46 Steel Co. of Canada

T2 Tenn. Coal & Iron Div., U. S. Steel Corp.
T3 Tenn. Products & Chemical Corp.
T4 Texas Steel Co.
T5 Thomas Strip Div., Pittsburgh Steel Co.
T6 Thompson Wire Co.
T7 Timken Roller Bearing
T9 Tonawanda Iron Div., Am. Rad. & Stan. San.
T13 Tube Methods Inc.
T19 Techalloy Co. Inc.

U3 Union Wire Rope Corp.
U4 Universal-Cyclops Steel
U5 U .S. Steel Corp.
U6 U. S. Pipe & Foundry
U7 Ulbrich Stainless Steels
U8 U. S. Steel Supply Div., U. S. Steel Corp.
U11 Union Carbide Metals Co.
U13 Union Steel Corp.

V2 Vanadium-Alloy Steel
V3 Vulcan-Kidd Steel Div., H. K. Porter Co.

W1 Wallace Barnes Steel Div., Associated Spring
W2 Wallingford Steel Co.
W3 Washburn Wire Co.
W4 Washington Steel Corp.
W6 Weirton Steel Co.
W8 Western Automatic Machine Screw Co.
W9 Wheatland Tube Co.
W10 Wheeling Steel Corp.
W12 Wickwire Spencer Steel Div., Colo. Fuel & Iron
W13 Wilson Steel & Wire Co.
W14 Wisconsin Steel Div., International Harvester
W15 Woodward Iron Co.
W18 Wyckoff Steel Co.

Y1 Youngstown Sheet&Tube

STRIP

STRIP, Hot-Rolled Carbon

Ala.City,Ala. (27) R2	5.10
Allenport,Pa. P7	5.10
Alton,Ill. L1	5.30
Ashland,Ky.(8) A10	5.10
Atlanta A11	5.10
Bessemer,Ala. T2	5.10
Birmingham C15	5.10
Conshohocken,Pa. A3	5.15
Detroit M1	5.10
Ecorse,Mich. G5	5.10
Fairfield,Ala. T2	5.10
Farrell,Pa. S3	5.10
Fontana,Calif. K1	5.825
Gary,Ind. U5	5.10
Ind.Harbor,Ind. I-2, Y1	5.10
Johnstown,Pa.(25) B2	5.10
Lackawanna,N.Y.(25) B2	5.10
LosAngeles(25) B3	5.85
LosAngeles C1	8.60
Minnequa,Colo. C10	6.20
Riverdale,Ill. A1	5.10
SanFrancisco S7	6.60
Seattle(25) B3	6.10
Seattle N14	6.60
Sharon,Pa. S3	5.10
S.Chicago,Ill. W14	5.10
S.SanFrancisco(25) B3	5.85
SparrowsPoint,Md. B2	5.10
Torrance,Calif. C11	5.85
Warren,O. R2	5.10
Weirton,W.Va. W6	5.10
Youngstown U5	5.10

STRIP, Hot-Rolled Alloy

Carnegie,Pa. S18	8.40
Farrell,Pa. S3	8.40
Gary,Ind. U5	8.40
Houston S5	8.65
Ind.Harbor,Ind. Y1	8.40
KansasCity,Mo. S5	8.65
LosAngeles B3	9.60
Lowellville,O. S3	8.40
Newport,Ky. A2	8.40
Sharon,Pa. A2, S3	8.40
S.Chicago,Ill. W14	8.40
Youngstown U5, Y1	8.40

STRIP, Hot-Rolled High-Strength, Low-Alloy

Ashland,Ky. A10	7.575
Bessemer,Ala. T2	7.575
Conshohocken,Pa. A3	7.575
Ecorse,Mich. G5	7.575
Fairfield,Ala. T2	7.575
Farrell,Pa. S3	7.575
Gary,Ind. U5	7.575
Ind.Harbor,Ind. I-2, Y1	7.575
Lackawanna,N.Y. B2	7.575
LosAngeles(25) B3	8.325
Seattle(25) B3	8.575
Sharon,Pa. S3	7.575
S.Chicago,Ill. W14	7.575
S.SanFrancisco(25) B3	8.325
SparrowsPoint,Md. B2	7.575
Warren,O. R2	7.575
Weirton,W.Va. W6	7.575
Youngstown U5, Y1	7.575

STRIP, Hot-Rolled Ingot Iron

Ashland,Ky.(8) A10	5.35
Warren,O. R2	5.875

STRIP, Cold-Rolled Carbon

Anderson,Ind. G6	7.425
Baltimore T6	7.425
Boston T6	7.975
Buffalo S40	7.425
Cleveland A7, J5	7.425
Dearborn,Mich. S3	7.425
Detroit D2, M1, P20	7.425
Dover,O. G6	7.425
Evanston,Ill. M22	7.525
Farrell,Pa. S3	7.425
Follansbee,W.Va. W10	7.425
Fontana,Calif. K1	9.20
FranklinPark,Ill. T6	7.525
Ind.Harbor,Ind. Y1	7.425
Indianapolis S41	7.575
LosAngeles C1, S41	9.30
McKeesport,Pa. E10	7.525
NewBedford,Mass. R10	7.875
NewBritain,Conn. S15	7.875
NewCastle,Pa. B4, M23	7.425
NewHaven,Conn. D2	7.875
NewKensington,Pa. A6	7.425
Pawtucket,R.I. R3, N8	7.975
Philadelphia P24	7.875
Pittsburgh J5	7.425
Riverdale,Ill. A1	7.525
Rome,N.Y.(32) R6	7.425
Sharon,Pa. S3	7.425
Trenton,N.J.(31) R5	8.875
Warren,O. R2, T5	7.425
Worcester,Mass. A7	7.975

STRIP, Cold-Rolled Alloy

Boston T6	15.90
Cleveland A7	15.55
Carnegie,Pa. S18	15.55
Dover,O. G6	15.55
Farrell,Pa. S3	15.55
FranklinPark,Ill. T6	15.55
Harrison,N.J. S18	15.55
Indianapolis S41	15.70
LosAngeles S41	17.75
Lowellville,O. S3	15.55
Pawtucket,R.I. N8	15.90
Riverdale,Ill. A1	15.55
Sharon,Pa. S3	15.55
Worcester,Mass. A7	15.85
Youngstown S41	15.55

STRIP, Cold-Rolled High-Strength, Low-Alloy

Cleveland A7	10.80
Dearborn,Mich. S3	10.80
Dover,O. G6	10.80
Farrell,Pa. S3	10.80
Ind.Harbor,Ind. Y1	10.80
Sharon,Pa. S3	10.80
Warren,O. R2	10.80
Weirton,W.Va. W6	10.80
Youngstown Y1	10.80

STRIP, Cold-Rolled Ingot Iron

Warren,O. R2	8.175

STRIP, Cold-Finished Spring Steel (Annealed)

	0.26-0.40C	0.41-0.60C	0.61-0.80C	0.81-1.05C	1.06-1.35C
Anderson,Ind. G6	9.10	....	....	....	....
Baltimore T6	9.50	10.70	12.90	15.90	18.85
Boston T6	9.50	10.70	12.90	15.90	18.86
Bristol,Conn. W1	....	10.70	12.90	16.10	19.30
Carnegie,Pa. S18	8.95	10.40	12.60	15.60	....
Cleveland A7	8.95	10.40	12.60	15.60	18.55
Dearborn,Mich. S3	9.06	10.50	12.70	....	....
Detroit D2	9.06	10.50	12.70	15.70	....
Dover,O. G6	8.95	10.40	12.60	15.60	18.55
Evanston,Ill. M22	9.06	10.40	12.60	15.60	....
Farrell,Pa. S3	8.95	10.40	12.60	15.60	18.55
Fostoria,O. S1	10.06	10.40	12.60	15.60	....
FranklinPark,Ill. T6	9.06	10.40	12.60	15.60	18.55
Harrison,N.J. C18	....	....	12.90	16.10	19.30
Indianapolis S41	9.10	10.55	12.60	15.60	18.55
LosAngeles C1	11.15	12.60	14.80	17.80	....
LosAngeles S41	11.15	12.60	14.80	....	....
NewBritain,Conn. S15	9.40	10.70	12.90	15.90	18.85
NewCastle,Pa. B4, M23	8.95	10.40	12.60	15.60	....
NewHaven,Conn. D2	9.40	10.70	12.90	15.90	....
NewKensington,Pa. A6	8.95	10.40	12.60	15.60	....
NewYork W3	....	10.70	12.90	16.10	19.30
Pawtucket,R.I. N8	9.50	10.70	12.90	15.90	18.85
Riverdale,Ill. A1	9.06	10.40	12.60	15.60	18.55
Rome,N.Y. R6	8.95	10.40	12.60	15.60	18.55
Sharon,Pa. S3	8.95	10.40	12.60	15.60	18.56
Trenton,N.J. R5	....	10.70	12.90	15.90	18.85
Warren,O. T5	8.95	10.40	12.60	15.60	18.56
Worcester,Mass. A7, T6	9.50	10.70	12.90	15.90	18.85
Youngstown S41	8.95	10.40	12.60	15.80	18.56

Spring Steel (Tempered)

	Up to 0.80C	0.81-1.05C	1.06-1.35C
Bristol,Conn. W1	18.85	22.95	27.80
Buffalo W12	18.85	....	....
Fostoria,O. S1	19.05	22.15	....
FranklinPark,Ill. T6	19.20	23.30	28.15
Harrison,N.J. C18	18.85	22.95	27.80
NewYork W3	18.86	22.95	27.80
Palmer,Mass. W12	18.85	....	....
Trenton,N.J. R5	18.85	22.95	27.80
Worcester,Mass. A7, T6	18.85	22.95	27.80
Youngstown S41	19.20	23.30	28.15

STRIP, C.R., Electrogalvanized

Cleveland A7	7.425*
Dover,O. G6	7.425*
Evanston,Ill. M22	7.525*
McKeesport,Pa. E10	7.50*
NewCastle,Pa. M23	7.425*
Riverdale,Ill. A1	7.525*
Warren,O. B9, S3, T5	7.425*
Worcester,Mass. A7	7.975
Youngstown S41, Y1	7.425*

*Plus galvanizing extras.

STRIP, Galvanized (Continuous)

Farrell,Pa. S3	7.50
Sharon,Pa. S3	7.50

TIGHT COOPERAGE HOOP

Atlanta A11	5.825
Farrell,Pa. S3	5.525
Riverdale,Ill. A1	5.675
Sharon,Pa. S3	5.525
Youngstown U5	5.525

TIN PLATE, Electrolytic (Base Box)

	0.25 lb	0.50 lb	0.75 lb
Aliquippa,Pa. J5	$9.10	$9.35	$9.75
Fairfield,Ala. T2	9.20	9.45	9.85
Fairless,Pa. U5	9.20	9.45	9.85
Fontana,Calif. K1	9.75	10.00	10.40
Gary,Ind. U5	9.10	9.35	9.75
GraniteCity,Ill. G4	9.20	9.45	9.85
IndianaHarbor,Ind. I-2, Y1	9.10	9.35	9.75
Irvin,Pa. U5	9.10	9.35	9.75
Niles,O. R2	9.10	9.35	9.75
Pittsburg,Calif. C11	9.75	10.00	10.40
SparrowsPoint,Md. B2	9.10	9.35	9.75
Weirton,W.Va. W6	9.10	9.35	9.75
Yorkville,O. W10	9.10	9.35	9.75

ELECTROLYTIC TIN-COATED SHEET (Dollars per 100 lb)

Aliquippa,Pa. J5 (21-27 Ga.)	....	7.90	8.10	....
IndianaHarbor,Ind. Y1 (20-27 Ga.)	....	7.90	....	....
Niles,O. R2 (20-27 Ga.)	....	7.90	8.10	8.30

ELECTROLYTIC THIN TIN PLATE (FERROLITE)(¼ lb coating in coils)

	Base Box			
	45 lb	50 lb	55 lb	60 lb
Fairfield,Ala. T2	$6.20	$6.35	$6.50	$6.65
Fairless,Pa. U5	6.20	6.35	6.50	6.65
Gary,Ind. U5	6.10	6.25	6.40	6.55
Irvin,Pa. U5	6.10	6.25	6.40	6.55

TIN PLATE,Hot Dipped 1.25 1.50

Common Coke	lb	lb
Aliquippa,Pa. J5	$10.40	$10.65
Fairfield,Ala. T2	10.50	10.75
Fontana,Calif.K1	11.05	11.30
Gary,Ind. U5	10.40	10.65
Irvin,Pa. U5	10.40	10.65
Pitts.Calif. C11	11.05	11.30
Sp.Pt.Md. B2	10.40	10.65
Weirton,W.Va.W6	10.40	10.65
Yorkville,O. W10	10.40	10.65

BLACK PLATE (Base Box)

Aliquippa,Pa. J5	$8.20
Fairfield,Ala. T2	8.30
Fairless,Pa. U5	8.30
Fontana,Calif. K1	8.85
Gary,Ind. U5	8.20
GraniteCity,Ill. G4	8.30
Ind.Harbor,Ind. I-2, Y1	8.20
Irvin,Pa. U5	8.20
Niles,O. R2	8.20
Pittsburg,Calif. C11	8.85
SparrowsPoint,Md. B2	8.20
Weirton,W.Va. W6	8.20
Yorkville,O. W10	8.20

HOLLOWARE ENAMELING (Black Plate) (29 Gage)

Aliquippa,Pa. J5	7.85
Gary,Ind. U5	7.85
GraniteCity,Ill. G4	7.95
Ind.Harbor,Ind. Y1	7.85
Irvin,Pa. U5	7.85
Yorkville,O. W10	7.85

SILICON STEEL

C.R. COILS & CUT LENGTHS (22 Ga.)

Fully Processed (Semiprocessed ½c lower)	Field	Armature	Electric	Motor	Dynamo
BeechBottom,W.Va. W10	....	11.70	12.40	13.35	14.65
Brackenridge,Pa. A4	....	....	12.40	13.55	14.65
GraniteCity,Ill. G4	9.975*	11.30*	12.00*	13.15*	....
IndianaHarbor,Ind. I-2	9.875*	11.20*	11.90*	13.05*	....
Mansfield,O. E6	9.875*	11.70	12.40	13.55	14.65
Newport,Ky. A2	9.875	11.70*	12.40*	13.55*	14.65*
Niles,O. M21	9.875*	11.70	12.40	13.55	....
Vandergrift,Pa. U5	9.875*	11.70	12.40	13.55	14.65
Warren,O. R2	9.875*	11.70	12.40	13.55	14.65
Zanesville,O. A10	....	11.70†	12.40	13.55	14.65

	Stator
Vandergrift,Pa. U5	8.10
Mansfield,O. E6	8.10
Warren,O. R2 (Locore)	8.10

SHEETS (22 Ga., coils & cut lengths)

Fully Processed (Semiprocessed ½c lower)	T-72	T-65	T-58	T-52
BeechBottom,W.Va. W10	15.70	16.30	16.80	17.85
Vandergrift,Pa. U5	15.70	16.30	16.80	17.85
Zanesville,O. A10	15.70	16.30	16.80	17.85

C.R. COILS & CUT LENGTHS (22 Ga.)	Grain Oriented T-100	T-90	T-80	T-73	T-66	T-72
Brackenridge,Pa. A4	....	18.10	19.70	20.20	20.70	15.70††
Butler,Pa. A10	....	....	19.70	20.20	20.70	....
Vandergrift,Pa. U5	....	17.10	18.10	19.70	20.20	20.70	15.70
Warren,O. R2	....	....	....	....	....	....	15.70‡

*Semiprocessed. †Fully processed only. ‡Coils, annealed; semiprocessed ½c lower. ††Coils only.

WIRE

WIRE, Manufacturers Bright, Low Carbon

AlabamaCity,Ala. R2	8.00
Aliquippa,Pa. J5	8.00
Alton,Ill. L1	8.20
Atlanta A1	8.00
Bartonville,Ill. K4	8.10
Buffalo W12	8.00
Chicago W13	8.00
Cleveland A7, C20	8.00
Crawfordsville,Ind. M8	8.10
Donora,Pa. A7	8.00
Duluth A7	8.00
Fairfield,Ala. T2	8.00
Fostoria,O.(24) S1	8.10
Houston S5	8.25
Jacksonville,Fla. M8	8.35
Johnstown,Pa. B2	8.00
Joliet,Ill. A7	8.00
KansasCity,Mo. S5	8.25
Kokomo,Ind. C16	8.10
LosAngeles B3	8.95
Minnequa,Colo. C10	8.25
Monessen,Pa. P7, P16	8.00
Palmer,Mass. W12	8.30
Pittsburg,Calif. C11	8.95
Portsmouth,O. P12	8.00
Rankin,Pa. A7	8.00
S.Chicago,Ill. R2	8.00
S.SanFrancisco C10	8.95
SparrowsPoint,Md. B2	8.10
Sterling,Ill.(1) N15	8.00
Sterling,Ill. N15	8.10
Struthers,O. Y1	8.00
Waukegan,Ill. A7	8.00
Worcester,Mass. A7	8.30

WIRE, Cold Heading Carbon

Elyria,O. W8	8.00

WIRE, Gal'd., for ACSR

Bartonville,Ill. K4	12.65
Buffalo W12	13.40
Cleveland A7	12.65
Donora,Pa. A7	12.65
Duluth A7	12.65
Johnstown,Pa. B2	13.40
KansasCity,Mo. U3	12.90
Minnequa,Colo. C10	12.775
Monessen,Pa. P7, P16	12.65
Muncie,Ind. I-7	13.60
NewHaven,Conn. A7	12.95
Palmer,Mass. W12	13.70
Pittsburg,Calif. C11	13.45
Portsmouth,O. P12	12.65
Roebling,N.J. R5	12.95
SparrowsPt.,Md. B2	13.50
Struthers,O. Y1	13.40
Trenton,N.J. A7	12.95
Waukegan,Ill. A7	12.65
Worcester,Mass. A7	12.95

WIRE, Upholstery Spring

Aliquippa,Pa. J5	9.75
Alton,Ill. L1	9.95
Buffalo W12	9.75
Cleveland A7	9.75
Donora,Pa. A7	9.75
Duluth A7	9.75
Johnstown,Pa. B2	9.75
KansasCity,Mo. S5, U3	10.00
Kokomo,Ind. C16	9.85
LosAngeles B3	10.70
Minnequa,Colo. C10	9.95
Monessen,Pa. P7, P16	9.75
NewHaven,Conn. A7	10.05
Palmer,Mass. W12	10.05
Pittsburg,Calif. C11	10.70
Portsmouth,O. P12	9.75
Roebling,N.J. R5	10.05
S.Chicago,Ill. R2	9.75
S.SanFrancisco C10	10.70
Struthers,O. Y1	9.75
Trenton,N.J. A7	10.05
Waukegan,Ill. A7	9.75
Worcester,Mass. A7,J4,T6	10.05

WIRE, Fine & Weaving(8" Coils)

Alton,Ill. L1	16.50
Bartonville,Ill. K4	16.40
Chicago W13	16.30
Cleveland A7	16.30
Crawfordsville,Ind. M8	16.40
Fostoria,O. S1	16.30
Houston S5	16.55
Jacksonville,Fla. M8	16.65
Johnstown,Pa. B2	16.30
KansasCity,Mo. S5	16.55
Kokomo,Ind. C16	16.30
Minnequa,Colo. C16	16.55
Monessen,Pa. P16	16.30
Muncie,Ind. I-7	16.50
Palmer,Mass. W12	16.60
S.SanFrancisco C10	17.15
Waukegan,Ill. A7	16.30
Worcester,Mass. A7, J6	16.60

ROPE WIRE (A)

Bartonville,Ill. K4	13.45
Buffalo W12	13.45
Fostoria,O. S1	13.45
Johnstown,Pa. B2	13.45
Monessen,Pa. P7	13.45
Muncie,Ind. I-7	13.65
Palmer,Mass. W12	13.75
Portsmouth,O. P12	13.45
Roebling,N.J. R5	13.75
St.Louis L8	13.45
SparrowsPt.,Md. B2	13.55
Struthers,O. Y1	13.45
Worcester,Mass. J4	13.75

(A) Plow and Mild Plow; add 0.25c for Improved Plow.

WIRE, MB Spring, High-Carbon

Aliquippa,Pa. J5	9.75
Alton,Ill. L1	9.95
Bartonville,Ill. K4	9.85
Buffalo W12	9.75
Cleveland A7	9.75
Donora,Pa. A7	9.75
Duluth A7	9.75
Fostoria,O. S1	9.80
Johnstown,Pa. B2	9.75
KansasCity,Mo. S5, U3	10.00
LosAngeles B3	10.70
Milbury,Mass.(12) N6	10.05
Minnequa,Colo. C10	9.95
Monessen,Pa. P7, P16	9.75
Muncie,Ind. I-7	9.95
Palmer,Mass. W12	10.05
Pittsburg,Calif. C11	10.70
Portsmouth,O. P12	9.75
Roebling,N.J. R5	10.05
S.Chicago,Ill. R2	9.75
S.SanFrancisco C10	10.70
SparrowsPt.,Md. B2	9.85
Struthers,O. Y1	9.75
Trenton,N.J. A7	10.05
Waukegan,Ill. A7	9.75
Worcester,Mass.A7,J4,T6	10.05

TIN MILL PRODUCTS

TIN PLATE, Electrolytic (Base Box)

	0.25 lb	0.50 lb	0.75 lb
Aliquippa,Pa. J5	$9.10	$9.35	$9.75
Fairfield,Ala. T2	9.20	9.45	9.85
Fairless,Pa. U5	9.20	9.45	9.85
Fontana,Calif. K1	9.75	10.00	10.40
Gary,Ind. U5	9.10	9.35	9.75
GraniteCity,Ill. G4	9.20	9.45	9.85
IndianaHarbor,Ind. I-2, Y1	9.10	9.35	9.75
Irvin,Pa. U5	9.10	9.35	9.75
Niles,O. R2	9.10	9.35	9.75
Pittsburg,Calif. C11	9.75	10.00	10.40
SparrowsPoint,Md. B2	9.10	9.35	9.75
Weirton,W.Va. W6	9.10	9.35	9.75
Yorkville,O. W10	9.10	9.35	9.75

ELECTROLYTIC TIN-COATED SHEET (Dollars per 100 lb)

Aliquippa,Pa. J5 (21-27 Ga.)	....	7.90	8.10	....
IndianaHarbor,Ind. Y1 (20-27 Ga.)	....	7.90	....	....
Niles,O. R2 (20-27 Ga.)	....	7.90	8.10	8.30

ELECTROLYTIC THIN TIN PLATE (FERROLITE)(¼ lb coating in coils)

	Base Box			
	45 lb	50 lb	55 lb	60 lb
Fairfield,Ala. T2	$6.20	$6.35	$6.50	$6.65
Fairless,Pa. U5	6.20	6.35	6.50	6.65
Gary,Ind. U5	6.10	6.25	6.40	6.55
Irvin,Pa. U5	6.10	6.25	6.40	6.55

TIN PLATE,Hot Dipped 1.25 1.50

Common Coke	lb	lb
Aliquippa,Pa. J5	$10.40	$10.65
Fairfield,Ala. T2	10.50	10.75
Fontana,Calif.K1	11.05	11.30
Gary,Ind. U5	10.40	10.65
Irvin,Pa. U5	10.40	10.65
Pitts.Calif. C11	11.05	11.30
Sp.Pt.Md. B2	10.40	10.65
Weirton,W.Va.W6	10.40	10.65
Yorkville,O. W10	10.40	10.65

BLACK PLATE (Base Box)

Aliquippa,Pa. J5	$8.20
Fairfield,Ala. T2	8.30
Fairless,Pa. U5	8.30
Fontana,Calif. K1	8.85
Gary,Ind. U5	8.20
GraniteCity,Ill. G4	8.30
Ind.Harbor,Ind. I-2, Y1	8.20
Irvin,Pa. U5	8.20
Niles,O. R2	8.20
Pittsburg,Calif. C11	8.85
SparrowsPoint,Md. B2	8.20
Weirton,W.Va. W6	8.20
Yorkville,O. W10	8.20

HOLLOWARE ENAMELING (Black Plate) (29 Gage)

Aliquippa,Pa. J5	7.85
Gary,Ind. U5	7.85
GraniteCity,Ill. G4	7.95
Ind.Harbor,Ind. Y1	7.85
Irvin,Pa. U5	7.85
Yorkville,O. W10	7.85

WIRE, Tire Bead

Bartonville,Ill. K4	17.15
Monessen,Pa. P16	17.15
Roebling,N.J. R5	17.65

WIRE, Cold-Rolled Flat

Anderson,Ind. G6	12.35
Baltimore T6	12.65
Boston T6	12.65
Buffalo W12	12.35
Chicago W13	12.45
Cleveland A7	12.35
Crawfordsville,Ind. M8	12.35
Dover,O. G6	12.35
Farrell,Pa. S3	12.35
Fostoria,O. S1	12.35
FranklinPark,Ill. T6	12.45
Kokomo,Ind. C16	12.35
Massillon,O. R8	12.35
Milwaukee C23	12.55
Monessen,Pa. P7, P16	12.35
Palmer,Mass. W12	12.65
Pawtucket,R.I. N8	12.65
Philadelphia P24	12.65
Riverdale,Ill. A1	12.45
Rome,N.Y. R6	12.35
Sharon,Pa. S3	12.35
Trenton,N.J. R5	12.65
Warren,O. B9	12.35
Worcester,Mass. A7,T6	12.65

NAILS, Stock Sizes

	Col.
AlabamaCity,Ala. R2	173
Aliquippa,Pa. J5	173
Atlanta A11	173
Bartonville,Ill. K4	175
Chicago W13	173
Cleveland A9	173
Crawfordsville,Ind. M8	175
Donora,Pa. A7	173
Duluth A7	173
Fairfield,Ala. T2	173
Houston S5	178
Jacksonville,Fla. M8	175
Johnstown,Pa. B2	173
Joliet,Ill. A7	173
KansasCity,Mo. S5	178
Kokomo,Ind. C16	175
Minnequa,Colo. C10	178
Monessen,Pa. P7	173
Pittsburg,Calif. C11	192
Rankin,Pa. A7	173
S.Chicago,Ill. R2	173
SparrowsPt.,Md. B2	175
Sterling,Ill.(7) N15	175
Worcester,Mass. A7	179

(To Wholesalers: per cwt)

Galveston,Tex. D7	$10.30

NAILS, CUT (100 lb kegs)

Wheeling,W.Va. W10	$10.10

POLISHED STAPLES

	Col.
AlabamaCity,Ala. R2	175
Aliquippa,Pa. J5	173
Atlanta A11	173
Bartonville,Ill. K4	175
Crawfordsville,Ind. M8	177
Donora,Pa. A7	173
Duluth A7	173
Fairfield,Ala. T2	173
Houston S5	180
Jacksonville,Fla. M8	177
Johnstown,Pa. B2	175
Joliet,Ill. A7	173
KansasCity,Mo. S5	180
Kokomo,Ind. C16	177
Minnequa,Colo. C10	178
Pittsburg,Calif. C11	194
Rankin,Pa. A7	173
S.Chicago,Ill. R2	175
SparrowsPt.,Md. B2	177
Sterling,Ill.(7) N15	175
Worcester,Mass. A7	179

TIE WIRE, Automatic Baler (14½ Ga.) (per 97 lb Net Box) Coil No. 3150

AlabamaCity,Ala. R2	$8.78
Atlanta A11	10.36
Bartonville,Ill. K4	8.88
Buffalo W12	10.26
Chicago W13	9.24
Crawfordsville,Ind. M8	8.88
Donora,Pa. A7	8.78
Duluth A7	8.78
Fairfield,Ala. T2	8.78
Houston S5	10.51
Jacksonville,Fla. M8	8.88
Johnstown,Pa. B2	8.78
Joliet,Ill. A7	8.78
KansasCity,Mo. S5	10.51
Kokomo,Ind. C16	8.88
LosAngeles B3	9.44
Minnequa,Colo. C10	9.02
Pittsburg,Calif. C11	9.44
S.Chicago,Ill. R2	8.78
S.SanFrancisco C10	9.94
SparrowsPt.,Md. B2	8.88
Sterling,Ill.(37) N15	8.88

Coil No. 6500 Stand.

AlabamaCity,Ala. R2	$9.06
Atlanta A11	10.70
Bartonville,Ill. K4	9.16
Buffalo W12	10.60
Chicago W13	9.54
Crawfordsville,Ind. M8	9.16
Donora,Pa. A7	9.06
Duluth A7	9.06
Fairfield,Ala. T2	9.06
Houston S5	10.85
Jacksonville,Fla. M8	9.16
Johnstown,Pa. B2	9.06
Joliet,Ill. A7	9.06
KansasCity,Mo. S5	10.85
Kokomo,Ind. C16	9.16
LosAngeles B3	9.75
Minnequa,Colo. C10	9.30
Pittsburg,Calif. C11	9.75
S.Chicago,Ill. R2	9.06
S.SanFrancisco C10	10.26
SparrowsPt.,Md. B2	9.16
Sterling,Ill.(37) N15	9.16

Coil No. 6500 Interim

AlabamaCity,Ala. R2	$9.11
Atlanta A11	10.75
Bartonville,Ill. K4	9.21
Buffalo W12	10.65
Chicago W13	9.59
Crawfordsville,Ind. M8	9.21
Donora,Pa. A7	9.11
Duluth A7	9.11
Fairfield,Ala. T2	9.11
Houston S5	10.90
Jacksonville,Fla. M8	9.21
Johnstown,Pa. B2	9.11
Joliet,Ill. A7	9.11
KansasCity,Mo. S5	10.96
Kokomo,Ind. C16	9.21
LosAngeles B3	9.80
Minnequa,Colo. C10	9.35
Pittsburg,Calif. C11	9.80
S.Chicago,Ill. R2	9.11
S.SanFrancisco C10	10.31
SparrowsPt.,Md. B2	9.21
Sterling,Ill.(37) N15	9.21

BALE TIES, Single Loop

	Col.
AlabamaCity,Ala. R2	212
Atlanta A11	212
Bartonville,Ill. K4	214
Crawfordsville,Ind. M8	214
Donora,Pa. A7	212
Duluth A7	212
Fairfield,Ala. T2	212
Houston S5	217
Jacksonville,Fla. M8	214
Joliet,Ill. A7	212
KansasCity,Mo. S5	217
Kokomo,Ind. C16	214
Minnequa,Colo. C10	217
SparrowsPt.,Md. B2	214
Sterling,Ill.(7) N15	214

FENCE POSTS

	Col.
Birmingham C15	177
Chicago Hts.,Ill. C2, I-2	177
Duluth A7	177
Franklin,Pa. F5	177
Johnstown,Pa. B2	177
Marion,O. P11	177
Minnequa,Colo. C10	182
Tonawanda,N.Y. B12	177

WIRE, Barbed

	Col.
AlabamaCity,Ala. R2	.193**
Aliquippa,Pa. J5	.190§
Atlanta A11	.197*
Bartonville,Ill. K4	.199
Crawfordsville,Ind. M8	.198
Donora,Pa. A7	.193†
Duluth A7	.193†
Fairfield,Ala. T2	.193†
Houston S5	.198**
Jacksonville,Fla. M8	.198
Johnstown,Pa. B2	.196§
Joliet,Ill. A7	.193†
KansasCity,Mo. S5	.198**
Kokomo,Ind. C16	.195†
Minnequa,Colo. C10	.198**
Monessen,Pa. P7	.196§
Pittsburg,Calif. C11	.213†
Rankin,Pa. A7	.193†
S.Chicago,Ill. R2	.193**
SparrowsPoint,Md. B2	.198§
Sterling,Ill.(7) N15	.198

WIRE (16 gage)	An'ld Galv. Stone	Galv. Stone
Ala.City,Ala.R2	17.85	19.40**
Ali'ppa,Pa. J5	..17.85	19.65
Bartonville K4	..17.95	19.80
Chicago W13	....17.85	....
Cleveland A7	....17.85	....
Craw'sville M8	17.95	19.80†‡
Fostoria,O. S1	..18.35	19.90†
Houston S5	....18.10	19.65**
Jacksonville M8	18.95	19.80†‡
Johnstown B2	..17.85	19.65§
Kan.City,Mo. S5	..18.10	....
Kokomo C16	....17.95	19.50†
Minnequa C10	..18.10	19.65**
P'lm'r,Mass.W12	18.15	19.70†
Pitts.,Calif. C11	18.20	19.75†
S.SanFran. C10	18.20	19.75**
St'ling(37) N15	..17.95	19.80
SparrowsPt. B2	..17.95	19.75§
Waukegan A7	..17.85	19.40†
Worcester A7	...18.15	....

WOVEN FENCE, 9-15 Ga. Col.

Ala.City,Ala. R2	187**
Aliq'ppa,Pa.9-11½ga.J5	190§
Atlanta A11	191*
Bartonville,Ill. K4	193
Crawfordsville,Ind. M8	192
Donora,Pa. A7	187†
Duluth A7	187†
Fairfield,Ala. T2	187†
Houston S5	192**
Jacksonville,Fla. M8	192
Johnstown,Pa.(42) B2	190§
Joliet,Ill. A7	187†
KansasCity,Mo. S5	192**
Kokomo,Ind. C16	189†
Minnequa,Colo. C10	192**
Pittsburg,Calif. C11	210†
Rankin,Pa. A1	187†
S.Chicago,Ill. R2	187**
Sterling,Ill.(7) N15	192

WIRE, Merchant Quality (6 to 8 gage)

	An'ld Galv.
Ala.City,Ala. R2	9.00 9.55**
Aliquippa J5	8.65 9.325§
Atlanta(48) A11	9.00 9.75*
Bartonville(48) K4	9.85 19.90
Buffalo W12	9.00 9.55†
Chicago W13	9.00 9.55**
Cleveland A7	9.00 ....
Crawfordsville M8	9.10 9.80††
Donora,Pa. A7	9.00 9.55†
Duluth A7	9.00 9.55†
Fairfield T2	9.00 9.55†
Houston(48) S5	9.25 9.80**
Jack'ville,Fla. M8	9.10 9.80‡‡
Johnstown(48) B2	9.00 9.675§
Joliet,Ill. A7	9.00 9.55†
KansasCity(48)S5	9.25 9.80**
Kokomo(48) S16	9.10 9.65†
LosAngeles B3	9.95 10.625§
Minnequa C10	9.25 9.80**
Monessen(48) P7	8.65 9.35§
Palmer,Mass. W12	9.30 9.85†
Pitts.,Calif. C11	9.95 10.50†
Rankin,Pa. A7	9.00 9.55†
S.Chicago R2	9.00 9.55**
S.SanFran. C10	9.95 10.50**
Spar'wsPt.(48)B2	9.10 9.775§
St'ling(37)(48)N15	9.10 9.80
Struthers,O. Y1	9.00 9.65‡
Worcester,Mass.A7	9.30 9.85†

Based on zinc prices of: *13.50c. †5c. §10c. ‡Less than 10c. ††10.50c. ‡‡11.00c. **Subject to zinc equalization extras.

RIVETS

F.o.b. Cleveland and/or freight equalized with Pittsburgh, f.o.b. Chicago and/or freight equalized with Birmingham except where equalization is too great.

Structural ½ in., larger 12.85

⅞ in. and smaller by 6 in. and shorter: 15% off list.

FASTENERS

(Consumer discounts per cent off list prices, orders for 1 container for assorted sizes; for less than container quantities, add 25 per cent; attaching nuts to bolts, package sizes, add 7.5 per cent; heavy hex nut 1⅛ in. through 1½ in. tapped 8 threads, add 10 per cent)

HEX HEAD CAP SCREWS, coarse, or fine thread, packaged or bulk, with or without hex nuts, 1020 steel bright and high carbon heat treated. ¼ in. thru 1 in. diam., listed lengths:

Plain Finish	50
Hot Galvanized and Zinc Plated:	
Packaged	43.75
Bulk	50

BOLTS, Standard stock sizes:

Plain Finish	50
Hot Galvanized and Zinc Plated:	
Packaged	43.75
*Bulk	50

*Hot galvanized or zinc plated lag bolts only — for package or bulk quantities use applicable list less bulk discounts.

CAP AND SETSCREWS,

Fillister Head, Cap Screws, Coarse Thread:

Packaged	+55
Bulk	+16

Flat Head Cap Screws: ¾ in. and smaller, 6 in. and shorter:

Packaged	+85
Bulk	+38

Setscrews, Square Head, Cup Point, Coarse Thread:

Through 1 in. diam., 6 in. and shorter:

Packaged	+ 5
Bulk	19

Through 1 in. diam., longer than 6 in.:

Packaged	+29

HEXAGON NUTS, American Standard: Finished hex, hex jam, and hex slotted coarse or fine thread, ¼ in. through 3 in., finished hex thick, thick and slotted, castle, fine thread, ¼ in. through 1½ in., semifinished hex heavy, heavy and jam, heavy and slotted, coarse thread, ¼ in. through 4 in., and

SQUARE NUTS, American Standard: Regular square and heavy square, coarse thread, ¼ in. through 2 in.:

Plain Finish	50
Hot Galvanized and Zinc Plated:	
Packaged	43.75
Bulk	50

PRESTRESSED STRAND

(High strength, stress relieved; 7 wire uncoated. Net prices per 1000 ft, 40,000 lb and over)

	Standard Diameter, Inches 1/4	5/16	3/8	7/16	1/2
Buffalo W12	$26.20	$38.50	$47.90	$61.30	$80.30
KansasCity,Mo. U3	26.20	38.50	47.90	61.30	80.30
Minnequa,Colo. C10	26.20	38.50	47.90	61.30	80.30
Pittsburg,Calif. C11	26.20	38.50	47.90	61.30	80.30
Roebling,N.J. R5	26.20	38.50	47.90	61.30	80.30
SparrowsPoint,Md. B2	26.20	38.50	47.90	61.30	80.30
St. Louis L8	26.20	38.50	47.90	61.30	80.30
Waukegan,Ill. A7	26.20	38.50	47.90	61.30	80.30

BOILER TUBES

Net base c.l. prices, dollars per 100 ft, mill; minimum wall thickness, cut length 10 to 24 ft, inclusive.

O.D. In.	B.W. Gage	Seamless H.R.	Seamless C.D.	Elec. Weld H.R.
1	13	....	27.24	23.13
1¼	13	....	32.25	24.41
1½	13	30.42	35.65	26.98
1¾	13	35.94	42.12	31.89
2	13	40.28	47.21	35.74
2¼	13	45.36	53.17	40.26
2½	12	49.24	57.72	43.70
2¾	12	54.23	63.57	48.13
3	12	58.73	68.83	52.13
3¼	12	62.62	73.40	55.59

RAILWAY MATERIALS

Rails	Standard No. 1	Standard No. 2	All No. 2	Tee Rails 60 lb Under
Bessemer,Pa. U5	5.75	5.65	....	6.725
Ensley,Ala. T2	5.75	5.65	....	6.725
Fairfield,Ala. T2	....	....	....	6.725
Gary,Ind. U5	5.75	5.65	....	....
Huntington,W.Va. C15	....	....	....	6.725
Johnstown,Pa. B2	....	....	....	(16)6.725
Lackawanna,N.Y. B2	5.75	5.65	....	6.725
Minnequa,Colo. C10	5.75	5.65	....	7.225
Steelton,Pa. B2	5.75	5.65	....	....
Williamsport,Pa. S19	....	....	....	6.725

TIE PLATES

Fairfield,Ala. T2	6.875
Gary,Ind. U5	6.875
Lackawanna,N.Y. B2	6.875
Minnequa,Colo. C10	6.875
Seattle B3	7.025
Steelton,Pa. B2	6.875
Torrance,Calif. C11	7.025

JOINT BARS

Bessemer,Pa. U5	7.25
Fairfield,Ala. T2	7.25
Joliet,Ill. U5	7.25
Lackawanna,N.Y. B2	7.25
Minnequa,Colo. C10	7.25
Steelton,Pa. B2	7.25

AXLES

Ind.Harbor,Ind. S13	9.125
Johnstown,Pa. B2	9.125

SCREW SPIKES

Lebanon,Pa. B2	15.10

TRACK BOLTS, Untreated

Cleveland R2	15.35
KansasCity,Mo. S5	15.35
Lebanon,Pa. B2	15.35
Minnequa,Colo. C10	15.35
Pittsburgh S44	15.35
Seattle B3	15.85

STANDARD TRACK SPIKES

Fairfield,Ala. T2	10.10
Ind.Harbor,Ind. I-2, Y1	10.10
KansasCity,Mo. S5	10.10
Lebanon,Pa. B2	10.10
Minnequa,Colo. C10	10.10
Pittsburgh J5	10.10
Seattle B3	10.60
S.Chicago,Ill. R2	10.10
Struthers,O. Y1	10.10
Youngstown R2	10.10

Footnotes

(1) Chicago base.
(3) Merchant.
(4) Reinforcing.
(5) 1½ to under 1 7/16 in.; 1 7/16 to under 1 15/16 in.; 6.70c; 1 15/16 to 8 in., inclusive, 7.05c.
(6) Limited analyses only.
(7) Chicago base 2 cols. lower.
(8) 16 Ga. and heavier.
(9) Merchant quality; add 0.35c for special quality.
(12) Worcester, Mass., base.
(15) ⅜" and thinner.
(16) 40 lb and under.
(17) Flats only; 0.25 in. & heavier.
(23) Special quality.
(24) Deduct 0.05c, finer than 15 Ga.
(25) Bar mill bands.
(26) Deld. in mill zone, 5.65c.
(27) Bar mill sizes.
(28) Bonderized.
(30) Sheared; for universal mill add 0.45c.
(31) Widths over ⅝ in.; 7.375c, for widths ⅝ in. and under by 0.125 in. and thinner.
(32) Buffalo base.
(33) 14 Ga., 48 in.
(35) 72" and narrower.
(36) 54" and narrower.
(37) Chicago base, 10 points lower.
(38) 13 Ga. & lighter; 60" & narrower.
(39) 48" and narrower.
(43) 9-14½ Ga.
(44) To fabricators.
(48) 6-7 Ga.
(49) 3½ in. and smaller rounds and 2¼ in. and smaller hexagons; 9.65c for larger rounds and hexagons and other shapes.

STEELMAKING AT JESSOP

175,000 pounds x 150 mph = shock treatment

The powerful jet engines whine in reduced-throttle restraint as the big, sleek aircraft maneuvers gracefully in its approach pattern.

In the cockpit, the crew goes through a check list. At one point the wheels are lowered and three green lights appear, indicating the gear is in position.

Then, a moment later, the pilot eases the 175,000 pound aircraft traveling 150 miles per hour onto the concrete—safely, surely, with confidence.

Probably, the steel in the landing gear was forged by Steel Improvement & Forge Company of Cleveland. For those components that bear the brunt of the impact, Steel Improvement purchases a Macro-Clean alloy made exclusively by Jessop at its Green River plant.

Only Jessop has it, this tough, sound-centered Macro-Clean alloy that takes in stride the transverse shock imposed on aircraft landing gear.

And the excellent physical properties inherent in Macro-Clean alloys make them ideally suited for numerous other applications too—crankshafts, gears of all kinds, pellet mills, driveshafts, large bearings and oil field goods for example.

Call any of Jessop's 23 sales offices in North America for Macro-Clean aircraft and forging quality alloys and a full range of specialty steels.

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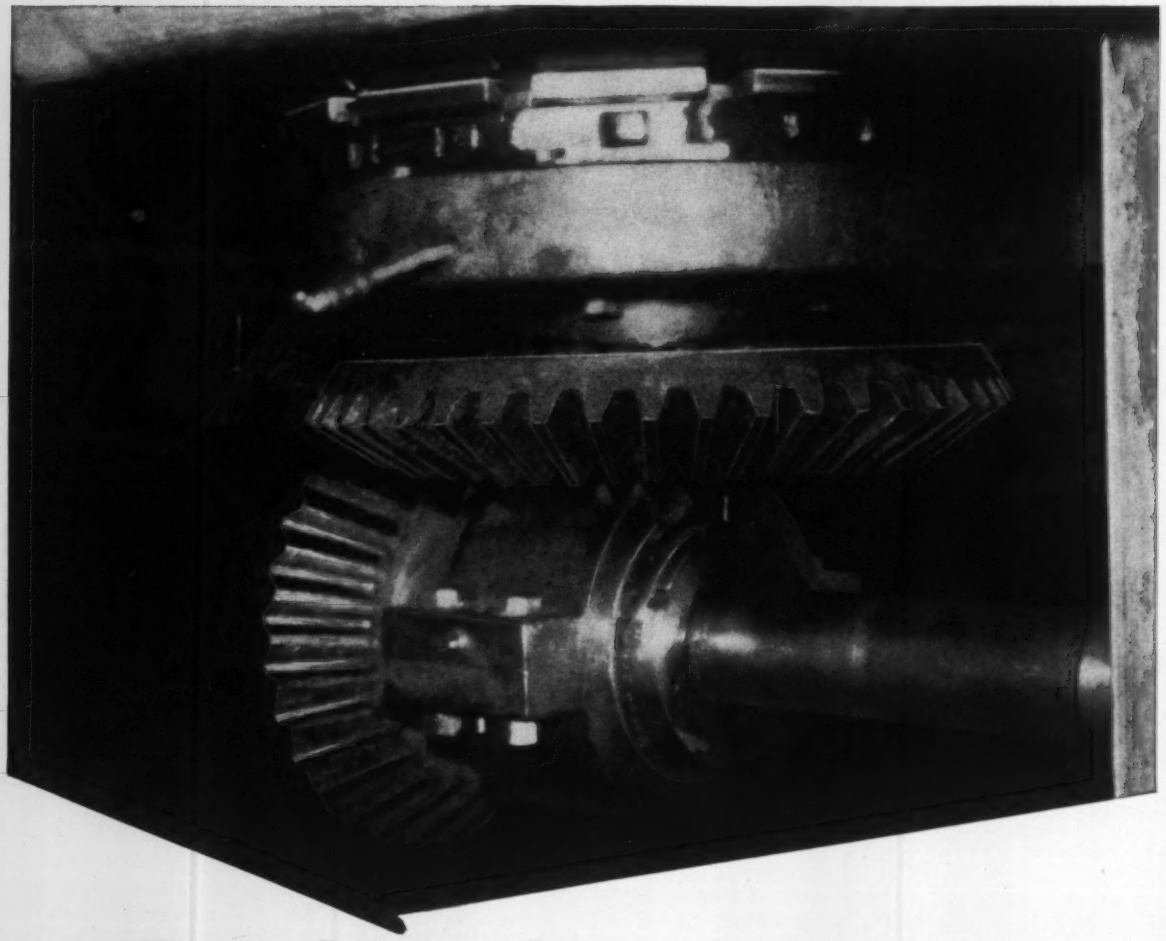

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Over two years ago our engineers converted this main drive gear from a babbitt bearing to a ball bearing unit on a machine in a customer's plant. Performance of this conversion, according to company engineers, has been outstanding! The housing for the bearings as well as the gear hub was produced by the customer in their own machine shop.

Prior to conversion, machine downtime was excessive because the babbitt had to be repoured every three or four months. A plus saving was in the reduction of power required to operate the machine. The customer now finds power consumption is 30% less!

If your older equipment can be modernized with anti-friction bearings — our engineers can show you how. If you need bearings for any purpose, our stock carrying branches can supply you. We are authorized distributors of most nationally known makes of bearings. We and the makers guarantee every bearing we supply.

Call the branch nearest you now!

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DIXIE BEARINGS, INC.

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SEAMLESS STANDARD PIPE, Threaded and Coupled

Carload discounts from list, %

Size—Inches	2		2½		3		3½		4		5		6	
List Per Ft	37c		58.5c		76.5c		92c		$1.09		$1.48		$1.92	
Pounds Per Ft	3.68		5.82		7.62		9.20		10.89		14.81		19.18	
	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*
Aliquippa, Pa. J5	+12.25	+28.75	+5.75	+23.5	+3.25	+21	+1.75	+19.5	+1.75	+19.5	+2	+19.75	0.5	+17.25
Ambridge, Pa. N2	+12.25	....	+5.75	....	+3.25	....	+1.75	....	+1.75	....	+2	....	0.5	....
Lorain, O. N3	+12.25	+28.75	+5.75	+23.5	+3.25	+21	+1.75	+19.5	+1.75	+19.5	+2	+19.75	0.5	+17.25
Youngstown Y1	+12.25	+28.75	+5.75	+23.5	+3.25	+21	+1.75	+19.5	+1.75	+19.5	+2	+19.75	0.5	+17.25

ELECTRICWELD STANDARD PIPE, Threaded and Coupled

Carload discounts from list, %

Youngstown R2	+12.25	+28.75	+5.75	+23.5	+3.25	+21	+1.75	+19.5	+1.75	+19.5	+2	+19.75	0.5	+17.25

BUTTWELD STANDARD PIPE, Threaded and Coupled

Carload discounts from list, %

Size—Inches	⅛		¼		⅜		½		¾		1		1¼	
List Per Ft	5.5c		6c		6c		8.5c		11.5c		17c		23c	
Pounds Per Ft	0.24		0.42		0.57		0.85		1.13		1.68		2.28	
	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*
Aliquippa, Pa. J5	....	....	....	....	....	....	2.25	+15	5.25	+11	8.75	+6.5	11.25	+5.25
Alton, Ill. L1	....	....	....	....	....	....	0.25	+17	3.25	+13	6.75	+8.5	9.25	+7.25
Benwood, W. Va. W10	1.5	+27	+10.5	+36	+21	+45.5	2.25	+15	5.25	+11	8.75	+6.5	11.25	+5.25
Butler, Pa. F6	4.5	+24	+8.5	+34	+19.5	+44	....	....	....	....	....	....	....	....
Etna, Pa. N2	....	....	....	....	....	....	2.25	+15	5.25	+11	8.75	+6.5	11.25	+5.25
Fairless, Pa. N3	....	....	....	....	....	....	0.25	+17	3.25	+13	6.75	+8.5	9.25	+7.25
Fontana, Calif. K1	....	....	....	....	....	....	+10.75	+28	+7.75	+24	+4.25	+19.5	+1.75	+18.25
Indiana Harbor, Ind. Y1	....	....	....	....	....	....	1.25	+16	4.25	+12	7.75	+7.5	10.25	+6.25
Lorain, O. N3	....	....	....	....	....	....	2.25	+15	5.25	+11	8.75	+6.5	11.25	+5.25
Sharon, Pa. S4	4.5	+24	+8.5	+34	+19.5	+44	....	....	....	....	....	....	....	....
Sharon, Pa. M6	....	....	....	....	....	....	2.25	+15	5.25	+11	8.75	+6.5	11.25	+5.25
Sparrows Pt., Md. B2	2.5	+26	+10.5	+36	+21.5	+46	0.25	+17	3.25	+13	6.75	+8.5	9.25	+7.25
Wheatland, Pa. W9	4.5	+24	+8.5	+34	+19.5	+44	2.25	+15	5.25	+11	8.75	+6.5	11.25	+5.25
Youngstown R2, Y1	....	....	....	....	....	....	2.25	+15	5.25	+11	8.75	+6.5	11.25	+5.25

Size—Inches	1½		2		2½		3		3½		4	
List Per Ft	27.5c		37c		58.5c		76.5c		92c		$1.09	
Pounds Per Ft	2.75		3.68		5.82		7.62		9.20		10.89	
	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*
Aliquippa, Pa. J5	11.75	+4.25	12.25	+3.75	13.75	+3.5	13.75	+3.5	3.25	+14.5	3.25	+14.5
Alton, Ill. L1	9.75	+6.25	10.25	+5.75	11.75	+5.5	11.75	+5.5	1.25	+16.5	1.25	+16.5
Benwood, W. Va. W10	11.75	+4.25	12.25	+3.75	13.75	+3.5	13.75	+3.5	3.25	+14.5	3.25	+14.5
Etna, Pa. N2	11.75	+4.25	12.25	+3.75	13.75	+3.5	13.75	+3.5	3.25	+14.5	3.25	+14.5
Fairless, Pa. N3	9.75	+6.25	10.25	+5.75	11.75	+5.5	11.75	+5.5	1.25	+16.5	1.25	+16.5
Fontana, Calif. K1	+1.25	+17.25	+0.75	+16.75	0.75	+16.5	0.75	+16.5	+9.75	+27.5	+9.75	+27.5
Indiana Harbor, Ind. Y1	10.75	+5.25	11.25	+4.75	12.75	+4.5	12.75	+4.5	2.25	+15.5	2.25	+15.5
Lorain, O. N3	11.75	+4.25	12.25	+3.75	13.75	+3.5	13.75	+3.5	....	....	....	....
Sharon, Pa. M6	11.75	+4.25	12.25	+3.75	13.75	+3.5	13.75	+3.5	....	....	....	....
Sparrows Pt., Md. B2	9.75	+6.25	10.25	+5.75	11.75	+5.5	11.75	+5.5	1.25	+16.5	1.25	+16.5
Wheatland, Pa. W9	11.75	+4.25	12.25	+3.75	13.75	+3.5	13.75	+3.5	3.25	+14.5	3.25	+14.5
Youngstown R2, Y1	11.75	+4.25	12.25	+3.75	13.75	+3.5	13.75	+3.5	3.25	+14.5	3.25	+14.5

*Galvanized pipe discounts based on price of zinc at 13.00c, East St. Louis.

Stainless Steel

Representative prices, cents per pound; subject to current lists of extras

AISI Type	—Rerolling— Ingot	Slabs	Forging Billets	H.R. Strip	H.R. Rods; C.F. Wire	Bars; Structural Shapes	Plates	Sheets	C.R. Strip; Flat Wire
201	22.75	25.00	....	36.00	....	43.50	39.25	48.50	45.00
202	24.75	28.25	37.75	39.00	42.25	44.50	40.00	49.25	49.25
301	24.00	26.00	38.75	37.25	43.50	46.00	41.25	51.25	47.50
302	26.25	29.50	39.50	40.50	44.25	46.75	42.25	52.00	52.00
302B	26.50	30.75	42.25	45.75	46.75	49.00	44.50	57.00	57.00
303	....	33.25	42.50	....	47.25	49.75	45.00	56.75	56.75
304	28.00	29.50	39.50	40.50	44.25	46.75	45.75	52.00	52.00
304L	....	37.25	47.25	48.25	52.00	54.50	53.50	59.75	59.75
305	29.50	34.75	44.00	47.50	47.00	49.50	46.25	58.75	58.75
308	32.00	36.25	49.00	50.25	54.75	57.75	55.25	63.00	63.00
309	41.25	47.50	60.00	64.50	66.25	69.50	66.00	80.50	80.50
310	51.50	59.50	81.00	84.25	89.75	94.50	87.75	96.75	96.75
314	....	....	80.50	....	89.75	94.50	87.75	....	104.25
316	41.25	47.50	64.50	68.50	71.75	75.75	71.75	80.75	80.75
316L	....	55.25	72.25	76.25	79.50	83.50	79.50	88.50	88.50
317	49.75	58.00	79.75	88.25	89.50	94.25	88.50	101.00	101.00
321	33.50	38.00	48.75	53.50	54.50	57.50	54.75	65.50	65.50
330	....	....	123.25	....	98.75	143.75	135.00	149.25	149.25
18-8 CbTa	38.50	48.25	57.75	63.50	63.75	67.25	64.75	79.25	79.25
403	....	....	29.25	....	33.25	35.00	30.00	40.25	40.25
405	20.25	26.50	30.75	36.00	34.75	36.50	32.50	46.75	46.75
410	17.50	19.50	29.25	31.00	33.25	35.00	30.00	40.25	40.25
416	....	....	29.75	....	33.75	35.50	31.25	48.25	48.25
420	....	31.50	35.50	41.75	40.75	42.75	40.25	62.00	62.00
430	17.75	19.75	29.75	32.00	33.75	35.50	31.00	40.75	40.75
430F	....	....	30.50	....	34.25	36.00	31.75	51.75	51.75
431	....	29.75	39.25	....	43.50	46.00	41.00	56.00	56.00
446	....	....	40.75	59.00	46.00	48.25	42.75	70.00	70.00

Producers Are: Allegheny Ludlum Steel Corp.; American Steel & Wire Div., U. S. Steel Corp.; Anchor Drawn Steel Co., division of Vanadium-Alloys Steel Co.; Armco Steel Corp.; Babcock & Wilcox Co.; Bethlehem Steel Co.; J. Bishop & Co.; A. M. Byers Co.; Calstrip Steel Corp.; G. O. Carlson Inc.; Carpenter Steel Co.; Carpenter Steel Co. of New England; Charter Wire Products; Crucible Steel Co. of America; Damascus Tube Co.; Dearborn Div., Sharon Steel Corp.; Wilbur B. Driver Co.; Driver-Harris Co.; Eastern Stainless Steel Corp.; Firth Sterling Inc.; Fort Wayne Metals Inc.; Green River Steel Corp., subsidiary of Jessop Steel Co.; Indiana Steel & Wire Co.; Ingersoll Steel Div., Borg-Warner Corp.; Ellwood Ivins Steel Tube Works Inc.; Jessop Steel Co.; Johnson Steel & Wire Co. Inc.; Stainless & Strip Div., Jones & Laughlin Steel Corp.; Joslyn Stainless Steels, division of Joslyn Mfg. & Supply Co.; Latrobe Steel Co.; Lukens Steel Co.; Maryland Fine & Specialty Wire Co. Inc.; McLouth Steel Corp.; Metal Forming Corp.; Midvale-Heppenstall Co.; National Standard Co.; National Tube Div., U. S. Steel Corp.; Pacific Tube Co.; Page Steel & Wire Div., American Chain & Cable Co. Inc.; Pittsburgh Rolling Mills Inc.; Republic Steel Corp.; Riverside-Alloy Metal Div., H. K. Porter Company Inc.; Rodney Metals Inc.; Sawhill Tubular Products Inc.; Sharon Steel Corp.; Simonds Saw & Steel Co.; Somers Brass Co.; Specialty Wire Co. Inc.; Standard Tube Co.; Superior Steel Div., Copperweld Steel Co.; Superior Tube Co.; Swepco Tube Corp.; Techalloy Co. Inc.; Timken Roller Bearing Co.; Trent Tube Co., subsidiary of Crucible Steel Co. of America; Tube Methods Inc.; Ulbrich Stainless Steel Inc.; Union Steel Corp.; U. S. Steel Corp.; Universal Cyclops Steel Corp.; Vanadium-Alloys Steel Co.; Wall Tube & Metal Products Co.; Wallingford Steel, subsidiary of Allegheny Ludlum Steel Corp.; Washington Steel Corp.; Seymour Mfg. Co.

Clad Steel

	Plates—Carbon Base 5%	10%	15%	20%	Sheets—Carbon Base 20%
Stainless					
302	....	....	....	....	37.50
304	26.05	28.80	31.55	34.30	39.75
304L	30.50	33.75	36.95	40.15	....
316	38.20	42.20	46.25	50.25	58.25
316L	42.30	46.75	51.20	55.65	....
316 Cb	49.90	55.15	60.40	65.65	....
321	31.20	34.50	37.75	41.05	47.25
347	36.90	40.80	44.65	48.55	57.00
405	22.25	24.60	26.90	29.25	....
410	20.55	22.70	24.85	27.00	....
430	21.20	23.45	25.65	27.90	....
Inconel	49.80	61.35	72.80	84.40	....
Nickel	43.20	55.05	66.95	78.90	....
Nickel, Low Carbon	43.50	55.70	67.95	80.35	....
Monel	44.25	55.35	66.45	77.60	....

	Strip, Carbon Base —Cold Rolled—
*Copper**	36.35 / 43.40

*Deoxidized. Production points: Stainless-clad sheets, New Castle, Ind. I-4; stainless-clad plates, Claymont, Del. P4; Coatesville, Pa. L7; New Castle, Ind. I-4, and Washington, Pa. J3; nickel, inconel, monel-clad plates, Coatesville L7; copper-clad strip, Carnegie, Pa. S18.

Tool Steel

Grade	$ per lb	Grade	$ per lb
Reg. Carbon (W-1)	0.330	Hi-Carbon-Cr (D-11)	0.955
Spec. Carbon (W-1)	0.385	V-Cr Hot Work (H-13)	0.550
Oil Hardening (O-1)	0.505	W-Cr Hot Work (H-12)	0.530
V-Cr Hot Work (H-11)	0.505	W Hot Wk (H-21)	1.425-1.44

Grade by Analysis (%) W	Cr	V	Co	Mo	AISI Designation	$ per lb
18	4	1	....	....	T-1	1.840
18	4	2	....	....	T-2	2.005
13.5	4	3	....	....	T-3	2.105
18.25	4.25	1	4.75	....	T-4	2.545
18	4	2	9	....	T-5	2.915
20.25	4.25	1.6	12.95	....	T-6	4.330
13.75	3.75	2	5	....	T-8	2.485
1.5	4	1	....	8.5	M-1	1.200
6.4	4.5	1.9	....	5	M-2	1.345
6	4	3	....	6	M-3	1.590

Tool steel producers include: A4, A8, B2, B8, C4, C9, C12, C18, F2, J3, L3, M14, S8, U4, V2, and V3.

Pig Iron

Prices in dollars per gross ton, f.o.b. (rail) furnace; add 50 cents when shipped by truck. Maximum delivered prices are approximate and based on rail shipment.

	Basic	No. 2 Foundry	Malle-able	Besse-mer
Birmingham District				
Birmingham R2	62.00	62.50**	66.50	....
Birmingham U6	....	62.50**	66.50	....
Woodward,Ala. W15	62.00*	62.50**	66.50	....
Cincinnati, deld.	....	70.20	....	....
Buffalo District				
Buffalo H1, R2	66.00	66.50	67.00	67.50
N.Tonawanda,N.Y. T9	....	66.50	67.00	67.50
Tonawanda,N.Y. W12	66.00	66.50	67.00	67.50
Boston, deld.	77.29	77.79	78.29	....
Rochester,N.Y., deld.	69.02	69.52	70.02	....
Syracuse,N.Y., deld.	70.12	70.62	71.12	....
Chicago District				
Chicago I-3	66.00	66.50	66.50	67.00
S.Chicago R2	66.00	66.50	66.50	67.00
S.Chicago,Ill. W14	66.00	....	66.50	67.00
Milwaukee, deld.	69.02	69.52	69.52	70.02
Muskegon,Mich., deld.	.....	74.52	74.52	....
Cleveland District				
Cleveland R2, A7	66.00	66.50	66.50	67.00
Akron,Ohio, deld.	69.52	70.02	70.02	70.52
Mid-Atlantic District				
Birdsboro,Pa. B10	68.00	68.50	69.00	69.50
Chester,Pa. P4	Nom.	Nom.	Nom.	....
Swedeland,Pa. A3	68.00	68.50	69.00	69.50
NewYork, deld.	....	75.41	75.91	....
Newark,N.J., deld	72.53	73.03	73.53	74.03
Philadelphia, deld.	70.18	70.68	71.18	71.68
Troy,N.Y. R2	68.00	68.50	69.00	69.50
Boston, deld.	75.20	75.70	76.20	76.70
Pittsburgh District				
NevilleIsland,Pa. P6	66.00	66.50	66.50	67.00
Pittsburgh (N&S sides), Aliquippa, deld.	....	67.95	67.95	68.48
McKeesRocks,Pa., deld.	....	67.60	67.60	68.13
Lawrenceville,Homestead, Wilmerding,Monaca,Pa., deld.	....	68.26	68.26	69.79
Verona,Trafford,Pa., deld.	68.29	68.82	68.82	69.35
Brackenridge,Pa., deld.	68.60	69.10	69.10	69.63
Midland,Pa. C18	66.00	....	....	....
Youngstown District				
Hubbard,Ohio Y1	....	....	66.50	....
Sharpsville,Pa. S6	66.00	....	66.50	67.00
Youngstown Y1	....	....	66.50	....
Mansfield,Ohio, deld.	71.30	....	71.80	72.30

	Basic	No. 2 Foundry	Malle-able	Besse-mer
Other U. S. Districts				
Duluth I-3	66.00	66.50	66.50	67.00
Erie,Pa. I-3	66.00	66.50	66.50	67.00
Fontana,Calif. K1	75.00	75.50	....	....
Geneva,Utah C11	66.00	66.50	....	....
GraniteCity,Ill. G4	67.90	68.40	68.90	....
Ironton,Utah C11	66.00	66.50	....	....
Minnequa,Colo. C10	68.00	68.50	69.00	....
Rockwood,Tenn. T3	62.00	62.50‡	66.50	67.00
Toledo,Ohio I-3	66.00	66.50	66.50	67.00
Cincinnati, deld.	72.94	73.44	....	....
Canadian District				
Hamilton,Ont. S46	65.00	65.00	65.50	....
SaultSte.Marie,Ont. A25	65.00	65.00	65.50	66.00

*Phos. 0.70-0.90%; Phos. 0.30-0.69%, $63.
**Phos. 0.70-0.90%; Phos. 0.30-0.69%,$63.50.
‡Phos. 0.50% up; Phos. 0.30-0.49%, $63.50.

PIG IRON DIFFERENTIALS

(Applicable to U. S. produced iron)

Silicon: Add 75 cents per ton for each 0.25% Si or percentage thereof over base grade, 1.75-2.25%, except on low phos. iron on which base is 1.75-2.00%.

Manganese: Add 50 cents per ton for each 0.25% manganese over 1% or portion thereof.

BLAST FURNACE SILVERY PIG IRON, Gross Ton

(Base 6.01-6.50% silicon; add 75c for each 0.50% silicon or portion thereof over the base grade within a range of 6.50 to 11.50%; starting with silicon over 11.50% add $1.50 per ton for each 0.50% silicon or portion thereof up to 14%; add $1 for each 0.50% Mn over 1%)

Jackson,Ohio I-3, J1	$78.00
Buffalo H1	79.25

ELECTRIC FURNACE SILVERY IRON, Gross Ton

(Base 14.01-14.50% silicon; add $1 for each 0.5% Si to 18%; $1.25 for each 0.50% Mn over 1%; $2 per gross ton premium for 0.045% max P)

CalvertCity,Ky. P15	$99.00
Niagara Falls,N.Y. P15	99.00
Keokuk,Iowa Open-hearth & Fdry, K2	89.00
Keokuk,Iowa O.H. & Fdry, 14½ lb piglets, 16% Si, K2	92.00

LOW PHOSPHORUS PIG IRON, Gross Ton

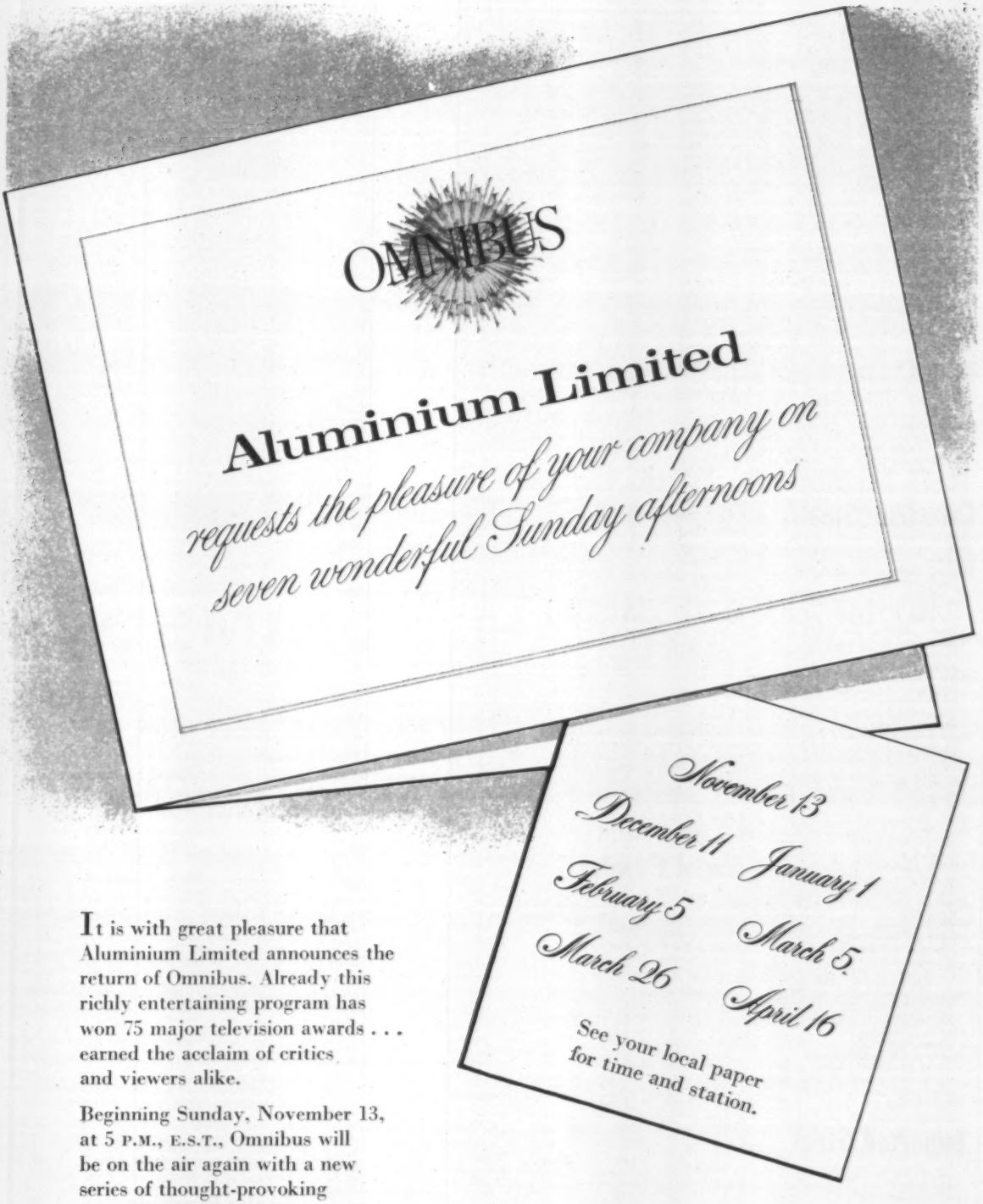
Birdsboro,Pa. B10 (Phos. 0.075% max)	$73.00
Lyles,Tenn. T3 (Phos. 0.035% max)	73.00
Rockwood,Tenn. T3 (Phos. 0.035% max)	73.00
Buffalo H1 (Intermediate) (0.036-0.075% max)	71.50
Cleveland A7 (Intermediate) (Phos. 0.036-0.075% max)	71.00
Duluth I-3 (Intermediate) (Phos. 0.036-0.075% max)	71.00
Erie,Pa. I-3 (Intermediate) (Phos. 0.036-0.075% max)	71.00
NevilleIsland,Pa. P6 (Intermediate) (Phos. 0.036-0.075% max)	71.00
Swedeland,Pa. A3 (Intermediate) (Phos. 0.036-0.075% max)	73.00
Troy,N.Y. R2 (Phos. 0.075% max)	73.00

Steel Service Center Products

Representative prices, cents per pound, f.o.b. warehouse, for 2000 lb items (except stainless) ordered by themselves. Prices will vary with total weight of the order or weight of the individual items or both. Base quantities for stainless sheets: 8000 lb, except in Chicago, New York, Boston, Los Angeles, and San Francisco, 10,000 lb. City delivery charges are 15 cents per 100 lb except: Denver, 20 cents; Baltimore, Boston, New York, Philadelphia, San Francisco, 10 cents; Atlanta, Birmingham, Dallas, Houston, Los Angeles, Seattle, no charge.

	SHEETS				STRIP	BARS			STRUCTURAL	PLATES	
	Hot Rolled	Cold Rolled	Galv.	Stainless Type 302	Hot Rolled	H.R. Rounds	C.F. Rounds	H.R. Alloy 4140	SHAPES	Carbon	Floor
Atlanta	9.37	10.61	11.83	...	10.85	9.53	13.24	....	9.94	9.73	11.16
Baltimore	7.77	8.66	10.06	....	8.28	8.55	11.80	16.38	9.03	8.34	10.02
Birmingham	9.43	10.20	10.46	....	10.41	8.26	13.14	16.76	8.47	8.41	10.05
Boston	9.67	10.58	11.77	53.50	12.16	9.77	13.35	16.59	10.16	9.62	11.08
Buffalo	8.65	9.80	11.25	55.98	11.00	8.75	11.45	16.30	9.15	8.65	11.10
Charlotte, N. C.	9.87	11.22	10.30	....	10.86	9.67	12.68	....	9.88	9.82	11.46
Chicago	8.57	10.20	10.15	52.00	10.74	8.55	10.65	15.95	8.91	8.41	10.68
Cincinnati	8.74	10.26	10.20	65.30	11.06	8.87	11.53	16.27	9.47	8.79	11.01
Cleveland	8.57	9.88	11.24	56.18	10.86	8.66	11.25	16.06	9.30	8.65	10.92
Dallas	9.62	10.05	12.59	....	11.18	9.03	12.98	16.95	9.26	9.35	11.00
Detroit	8.83	10.46	10.50	52.00	11.11	8.86	11.01	16.23	9.47	8.78	10.94
Denver	9.41	11.77	12.11	....	9.86	10.10	11.47	....	10.02	9.69	11.83
Houston	9.22	9.65	12.19	52.00	10.78	8.63	13.10	16.55	8.86	8.95	10.60
Indianapolis	9.01	10.64	10.59	....	11.18	8.99	11.09	16.39	9.35	8.85	11.12
Kansas City	9.21	10.87	11.35	....	10.87	9.31	11.57	15.72	9.80	9.10	....
Los Angeles	8.95	11.20	11.45	61.27	10.65	9.00	14.20	17.35	9.90	8.40	11.15
Memphis, Tenn.	9.84	10.05	....	....	10.64	9.82	12.74	....	9.16	8.66	11.41
Milwaukee	8.71	10.34	10.29	....	10.88	8.69	10.89	16.09	9.13	8.55	10.82
Moline, Ill.	8.92	10.55	10.50	....	10.90	8.90	11.15	16.45	9.26	8.76	10.96
Newark, N. J.	9.36	10.13	11.35	....	11.46	9.74	13.25	16.40	10.20	9.51	11.05
New York	9.36	10.13	11.35	52.98	11.46	9.74	13.25	16.40	10.20	9.51	11.05
Philadelphia	8.35	9.60	10.66	52.71	10.35	8.75	11.95	16.38	8.95	8.70	9.95
Pittsburgh	8.57	9.88	11.13	52.00	10.84	8.55	11.25	15.95	8.91	8.41	10.68
Portland, Oreg.	9.45	11.30	12.35	....	11.45	9.45	16.65	17.80	10.05	9.60	11.75
St. Louis	8.77	10.58	10.53	....	10.94	8.77	11.28	16.33	9.14	8.62	10.91
St. Paul	8.84	9.59	10.84	....	11.01	8.82	11.49	16.54	9.18	8.68	10.44
San Francisco	10.17	11.69	11.40	54.00	11.78	10.07	15.10	17.25	10.49	10.38	12.47
Seattle	10.51	11.57	12.50	54.02	11.95	9.94	16.20	17.80	10.65	10.10	12.73
Spokane, Wash.	10.36	11.42	12.35	54.02	11.80	9.79	16.20	17.80	10.50	9.95	12.58

Specifications: Hot rolled sheet, sheared edge, 10 Ga. & 36 & 96-120 in.; cold rolled sheets, 20 Ga. & 36 x 96-120 in.; galvanized sheets, 10 Ga. x 36 x 120 in. except Los Angeles, Dallas and Houston, 10 Ga. x 48 x 120 in.; stainless, 16 Ga. & 36 in.; hot rolled strip, ⅛ in. x 1 in.; hot rolled carbon bars, rounds, ⅜ in.—1¼ in., M1020; cold finished bars, 1 in., C1018; hot rolled alloy bars, 4140 annealed, 1⅝ in.—2⅞ in. rounds; structural shapes, I beams, 6 x 12½ in.; carbon plates, sheared, through ½ in. x 84 in.; floor plates, ¼ in. x 36 in.



It is with great pleasure that Aluminium Limited announces the return of Omnibus. Already this richly entertaining program has won 75 major television awards . . . earned the acclaim of critics and viewers alike.

Beginning Sunday, November 13, at 5 P.M., E.S.T., Omnibus will be on the air again with a new series of thought-provoking pieces . . . brought to you for the 6th season by one of North America's great aluminum producers. Aluminium Limited Sales, Inc., 630 Fifth Ave., New York 20, N. Y.

Aluminium Limited ALCAN

Refractories

Fire Clay Brick (per 1000 pieces*)

High-Heat Duty: Ashland, Grahn, Hayward, Hitchins, Haldeman, Olive Hill, Ky., Athens, Troup, Tex., Beech Creek, Clearfield, Curwensville, Lock Haven, Lumber, Orviston, West Decatur, Winburne, Snow Shoe, Pa., Bessemer, Ala., Farber, Mexico, St. Louis, Vandalia, Mo., Ironton, Oak Hill, Parrall, Portsmouth, Ohio, Ottawa, Ill., Stevens Pottery, Ga., Canon City, Colo., $140; Salina, Pa., $145; Niles, Ohio, $146; Cutler, Utah, $175.

Super-Duty: Ironton, Ohio, Vandalia, Mo., Olive Hill, Ky., Clearfield, Salina, Winburne, Snow Shoe, Pa., New Savage, Md., St. Louis, $185; Stevens Pottery, Ga., $195; Cutler, Utah, $248.

Silica Brick (per 1000 pieces*)

Standard: Alexandria, Clayburg, Mt. Union, Sproul, Pa., Ensley, Ala., Pt. Matilda, Pa.; Portsmouth, Ohio, Hawstone, Pa., St. Louis, $158; Warren, Niles, Windham, Ohio, Hays, Latrobe, Morrisville, Pa., $163; E. Chicago, Ind., Joliet, Rockdale, Ill., $168; Canon City, Colo., $173; Lehi, Utah, $183; Los Angeles, $185.

Super-Duty: Sproul, Hawstone, Pa., Niles, Warren, Windham, Ohio, Leslie, Md., Athens, Tex., $158; Morrisville, Hays, Latrobe, Pa., $163; E. Chicago, Ind., St. Louis, $168; Canon City, Colo., $183; Curtner, Calif., $185.

Semisilica Brick (per 1000 pieces*)

Woodbridge, N. J., Canon City, Colo., $140; Philadelphia, Clearfield, Pa., $145.

Ladle Brick (per 1000 pieces*)

Dry-Pressed: Alsey, Ill., Chester, New Cumberland, W. Va., Freeport, Johnstown, Merrill Station, Pa., Vandalia, Mo., New Salisbury, Ohio, $97; Vanport, Pa., Wellsville, Irondale, Ohio, $100; Clearfield, Pa., Portsmouth, Ohio, $102; St. Louis, Mexico, Mo., $120.

High-Alumina Brick (per 1000 pieces*)

50 *Per Cent:* St. Louis, Mexico, Vandalia, Mo., Danville, Ill., $250; Philadelphia, $265; Clearfield, Pa., $230; Orviston, Snow Shoe, Pa., $260.

60 *Per Cent:* St. Louis, Mexico, Vandalia, Mo., $310; Danville, Ill., $313; Clearfield, Orviston, Snow Shoe, Pa., $320; Philadelphia, $325.

70 *Per Cent:* St. Louis, Mexico, Vandalia, Mo., $350; Danville, Ill., $353; Clearfield, Orviston, Snow Shoe, Pa., $360; Philadelphia, $365.

Sleeves (per 1000)

St. Louis, $193; Reesdale, Johnstown, Bridgeburg, St. Charles, Pa., $188; Ottawa, Ill., $205.

Nozzles (per 1000)

Reesdale, Johnstown, Bridgeburg, St. Charles, Pa., St. Louis, $310.

Runners (per 1000)

Reesdale, Johnstown, Bridgeburg, St. Charles, Clearfield, Pa., $234.

Dolomite (per net ton)

Domestic, dead-burned bulk, Billmeyer, Blue Bell, Williams, Plymouth Meeting, York, Pa., Millville, W. Va., Bettsville, Millersville Martin, Woodville, Gibsonburg, Narlo, Ohio, $16.75; Thornton, McCook, Ill., $17; Dolly Siding, Bonne Terre, Mo., $15.00.

Magnesite (per net ton)

Domestic, dead-burned, ½ in. grains with fines; Chewelah, Wash., Luning, Nev., $46; ⅝ in. grains with fines: Baltimore (periclase), $73; Pascagoula, Miss. (periclase), $90.

*—9 in. x 4½ x 2.50 straights.

Ores

Lake Superior Iron Ore

(Prices effective for the 1960 shipping season, subject to later revision, gross ton, 51.50% iron natural, rail of vessel, lower lake ports.)

Mesabi bessemer	$11.60
Lump ⅛ in. and up	12.85
Fines, under ⅛ in.	10.72
Mesabi nonbessemer	11.45
Old Range bessemer	11.85
Old Range nonbessemer	11.70
Open-hearth lump	12.70
High phos.	11.45

Based on upper lake rail freight rates, lake vessel freight rates, handling and unloading charges, and taxes thereon, which were in effect Jan. 1, 1960; increases or decreases after that date are absorbed by the seller.

Eastern Local Iron Ore

New Jersey, concentrates ..... nom.

Foreign Iron Ore

Cents per unit

Swedish basic, 65%, c.i.f. Atlantic ports	23.00†
Chilean, 62-65%, c.i.f. Atlantic ports	22.00
Brazilian, 68.5% f.o.b. vessel, Victoria, per ton	$11.50

Tungsten Ore

Net ton, unit

Foreign wolframite, good commercial quality	$19.75-20.00*
Domestic, concentrates, f.o.b. milling points	22.00-23.00

Manganese Ore

Mn 46-58%, Indian, 85-90c, nom. per long ton unit, c.i.f. U. S. ports, duty for buyer's account.

Chrome Ore

Gross ton, f.o.b. cars New York, Philadelphia, Baltimore, Charlestown, S. C., plus ocean freight differential for delivery to Portland, Oreg., Tacoma, Wash.

Indian and Rhodesian

48% 3:1	$34.00-35.00†
48% no ratio	25.00-26.00†

South African Transvaal

44% no ratio	18.75†
48% no ratio	24.00-26.00†

Turkish

48% 3:1	36.00-37.00†

Domestic

Rail nearest seller

18% 3:1	30.00

Molybdenum

Sulfide concentrate, per lb of Mo content, mines, unpacked $1.23

Antimony Ore

Per short ton unit of Sb content, c.i.f. seaboard

55-60%	$2.50-2.80
60-65%	2.80-3.20

Vanadium Ore

Cents per lb V_2O_5

Domestic	31.00

*Before duty. †Nominal.

Canadian Steel

(Cents per pound, f.o.b. mill, except as otherwise noted.)

Billets, Blooms & Slabs:	
Carbon forging (N.T.)	$97.00
Carbon rerolling (N.T.)	78.00
Alloy (N.T.)	115.00
Wire Rods:	
Carbon	5.70
Alloy	6.40
Wire (carload lots):	
Merchant annealed	8.40
Low carbon indus.	7.20
Upholstery spring	8.55
M.B. spring	8.85
Bars & Small Shapes:	
Carbon, merchant	5.30
Carbon, special	5.85
Alloy	6.40
Bar Mill Bands:	
Carbon	5.40
Alloy	8.05
Bars, Reinforcing	5.30
Structural Shapes:	
Standard carbon	5.50
Angles & zees	5.40
Plates, Carbon:	
Sheared	5.[illegible]
Universal mill	5.10
Sheets & Coils, Hot Rolled:	
Carbon sheet	4.95
Carbon strip	5.00
Sheets & Coils, Cold Rolled:	
Carbon sheet	6.35
Carbon strip:	
(0.080 and lighter)	6.35
(0.081 and heavier)	6.65
Sheets & Coils, Galvanized:	
Standard quality	6.70
Culvert quality	7.00
Sheets, Porcelain Enameling	7.45
Sheets & Coils, Electrical:	
Field grade	9.00
Armature grade	9.50
Electrical grade	10.15
Sheet Piling	6.15
Skelp	4.70
Rails, Heavy	5.55
Rails, Light	5.70
Joint Bars	6.55
Tie Plates	6.35
Grinding Balls (3 in. diam.)	7.00
Tin Mill (Per base box:	
Products 100 lb base wt)	
Coke tin plate (1.25 lb pot yield)	$10.60
Electrolytic tin plate (0.25 lb coating)	9.10
Black plate	8.30
Nails, Wholesale:	
Carload lots	Col. 110

Base prices quoted by Algoma Steel Corp. Ltd., Sault Ste. Marie, Ont., are subject to maximum freight absorption per net ton to main consuming points depending on product as follows: Montreal, Que., $12.60; Toronto, Ont., $8; and Windsor, Ont., $10.60.

Metal Powder

(Per pound, f.o.b. shipping point in ton lots for minus 100 mesh, except as noted.)

	Cents
Sponge Iron, domestic and foreign, 98% Fe, min. trucklots, freight allowed east of Mississippi River:	
100 mesh, bags	11.50
100 mesh, pails	9.85§
40 mesh, bags	8.10††
Electrolytic Iron, Melting stock, 99.9% Fe, irreg. fragments, ⅛ in. x 1.3 in.	28.75
(In contract lots of 750 tons price is 22.75c.)	
Annealed, 99.5% Fe	36.75, ton, del. east of Mississippi.
Unannealed (99+% Fe)	33.0
Unannealed (99+% Fe) (minus 325 mesh)	58.0
Carbonyl Iron: 90-99.9%, 3 to 20 microns, depending on grade, 88.00-700.00 in standard 200-lb containers; all minus 200 mesh.	
Aluminum: Atomized, 600-lb drum freight allowed, c.l. 89.80; ton lots 41.80	
Brass, 80/20, leaded (60 mesh)	37.60
Bronze powder, 90/10	55.20
Copper, all types	15.25*
Lead	7.50*
Manganese, minus 35 mesh	1.00
Nickel, all types	0.78-1.06
Nickel-Silver	58.80
Solder	8.00*
Stainless Steel, 304	89.00
Stainless Steel, 316	$1.07
Steel, AISI 4650	32.00
Tin	14.00*
Zinc	24.70

	Dollars
Cobalt: 98.5%, minus 100-300 mesh	1.57-1.58
99.5%, below 5 microns	2.32
Tungsten: Carbon and hydrogen reduced, 98.8% min., minus 65 mesh	nom.**
Molybdenum	4.35

*Plus cost of metal. ‡Depending on mesh. §Cutting and scarfing grades. **Depending on price of ore. ††Welding grade.

Metallurgical Coke

Price per net ton

Beehive Ovens

Connellsville, Pa., furnace	$14.75-15.25
Connellsville, Pa., foundry	18.00-18.50

Oven Foundry

Birmingham, ovens	30.35
Cincinnati, deld.	33.34
Buffalo, ovens	32.00
Chattanooga, Tenn., ovens	30.80
Detroit, ovens	32.00
Pontiac, Mich., deld.	33.95
Saginaw, Mich., deld.	35.53
Erie, Pa., ovens	32.00
Everett, Mass., ovens:	
New England, deld.	33.55*
Indianapolis, ovens	31.25
Ironton, Ohio, ovens	30.50
Cincinnati, deld.	33.54
Kearny, N. J., ovens	31.25
Milwaukee, ovens	32.00
Neville Island (Pittsburgh), Pa., ovens	30.75
Painesville, Ohio, ovens	32.00
Cleveland, deld.	34.35
Philadelphia, ovens	31.00
St. Louis, ovens	33.00
St. Paul, ovens	31.25
Chicago, deld.	34.68
Swedeland, Pa., ovens	31.00
Terre Haute, Ind., ovens	31.25

*Within $5.15 freight zone from works.

Imported Steel

(Base per 100 lb, landed, duty paid; based on current ocean rates with any rise for buyer's acc't. Source of shipment: Western Europe)

	North Atlantic	Great Lakes*	South Atlantic	Gulf Coast	West Coast
Deformed Bars, Intermediate, ASTM-A 305	$5.42	....	$5.32	$5.17	$5.52
Bar Size Angles	5.55	....	5.45	5.30	5.65
Structural Angles	5.45	....	5.35	5.20	5.55
I-Beams	5.45	....	5.35	5.20	5.55
Channels	5.45	....	5.35	5.20	5.55
Plates (basic bessemer)	5.70	....	5.75	5.60	5.95
Sheets, hot rolled and galvanized	Nom.	....	Nom.	Nom.	Nom.
Furring Channels, C.R., 1000 ft, ¾ x 0.30 lb per ft	25.50	....	24.70	24.70	25.50
Barbed Wire (†)	6.25	....	6.15	6.00	6.35
Merchant Bars	5.55	....	5.45	5.30	5.65
Hot-Rolled Bands	5.85	....	5.75	5.60	5.95
Wire Rods, Thomas Commercial No. 5	6.05	....	5.95	5.95	6.25
Wire Rods, O. H., No. 5	6.25	....	6.15	6.15	6.45
Bright Common Wire Nails (§)	6.85	....	6.75	6.60	6.95

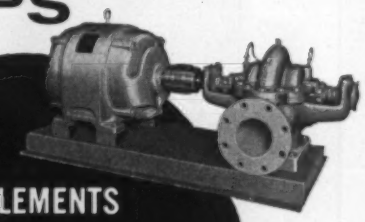
*Book closed for 1960-61 shipping season. †Per 82 lb net reel. §Per 100-lb keg, 20d nails and heavier.

Coal Chemicals

(Representative prices)

Cents per gal f.o.b. tank cars or tank trucks, plant.	
Pure benzene	31.00
Xylene, industrial grade	29.00
Creosote	24.00
Naphthalene, 78 deg.	6.00
Toluene, one deg. (deld. east of Rockies)	25.00
Cents per lb, f.o.b. tank cars or tank trucks, deld.	
Phenol, 90 per cent grade	14.75
Per net ton bulk, f.o.b. cars or trucks, plant.	
Ammonium sulfate, regular grade	$32.00

DEMING SPLIT-CASE CENTRIFUGAL PUMPS



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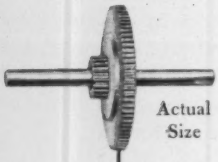

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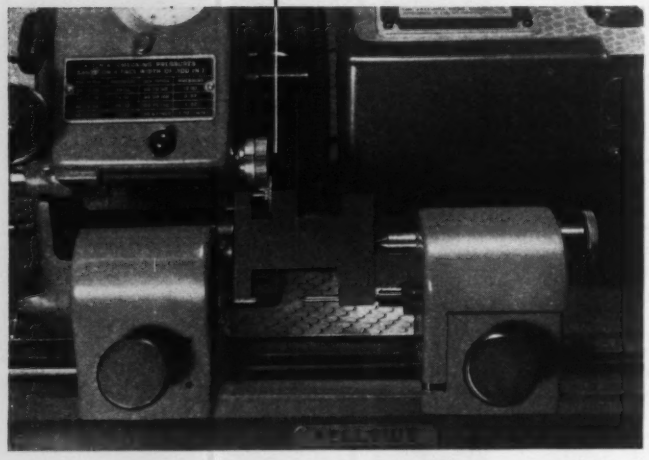
at 1600 magnifications

on the No. 4 Fellows Red Liner



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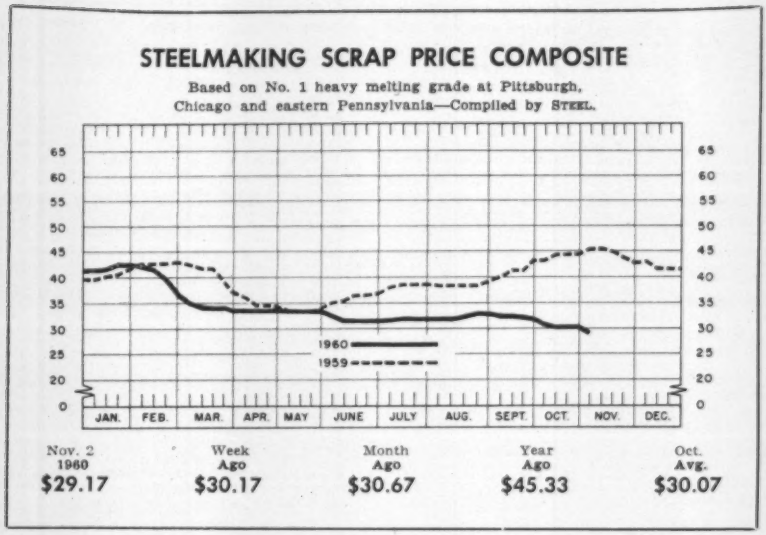

Scrapmen Fail to Hold Price Line

STEEL's composite on No. 1 heavy melting grade declines $1 a ton to $29.17, after holding steady for three straight weeks. Market now on lowest level since August, 1954

Scrap Prices, Page 162

• **Chicago**—Prices sagged on some key grades of steelmaking scrap when successful bids on 9000 tons of No. 1 factory bundles (to be produced this month) were about $2 lower than a month ago. The major portion of the tonnage will be taken at a price equivalent to $29.23, delivered Chicago, vs. $31.25 a month ago. Including brokerage, it's thought these bundles will go to the mills at a price between $30 and $31. A leading mill announced its price for No. 1 industrial heavy melting for November will be $28 a ton. That's down $2 from its October price. The company accepts return scrap from its customers on a selective basis.

• **Philadelphia** — Further weakness has developed in domestic scrap prices. No. 2 bundles and shoveling turnings are off $1 to $19, delivered, and machine shop turnings are down $2 to $13. The declines are due to light buying. The market on heavy melting steel is being sustained only by export purchases. In the cast iron grades, No. 1 cupola is off $1 to $38, delivered.

• **New York**—Brokers' buying prices have declined. Boring and turning items are especially weak, declining as much as $3 a ton on a purely nominal basis. Domestic demand is slow, and foreign business is lending less support to the market. The decline is expected to continue over the rest of this year.

Brokers' buying prices are: No. 1 heavy melting $27-$28; No. 2 heavy melting $18-$19; No. 1 bundles $27-$28; No. 2 bundles $13-$14—a drop of $2 in each case. Machine shop turnings have dipped to $4-$4.50, mixed borings and turnings to $4.50-$5, and shoveling turnings to $6-$7—all on a nominal basis. Low phos structurals and plates have declined to a nominal $31-$32. The cast iron grades are off $2, with No. 1 cupola now $34-$35, unstripped motor blocks $23-$24, and heavy breakable $28-$29.

In the stainless scrap specialties, 18-8 sheets, clips, and solids are off $5 to $150-$155 and 18-8 borings and turnings to $75-$80.

• **Buffalo**—Lower prices developed when mill orders were placed for shipment this month. The market's undertone continues soft, in part reflecting weakness at other points. Buying is limited, and indications are the drop of around $2 on November tonnage may have brought the market close to the bottom. Cast iron prices are unchanged, but show some signs of easing.

• **Cleveland**—Except for No. 1 industrial material, little scrap is moving into consumption from this district. Both the mills and foundries are taking only limited tonnages, and dealers' price views vary widely. In the absence of representative dealer scrap sales, published prices represent brokers' views of delivered quotations. Published prices, generally, are down about $2 a ton from a week ago. No. 1 heavy melting being quoted $23-$24 at Cleveland, and $26-$27 at Youngstown.

• **Pittsburgh**—Brokers for a mill on the fringe of the district bought No. 1 heavy melting scrap at $27 a ton, delivered, off $2. A leading local consumer bought a substantial quantity of No. 2 bundles at $21, off $3. The local plant of GM's Fisher Body Div. sold No. 1 factory bundles to brokers for $28.50 to $29, down $3 to $4 from last month's prices.

• **Detroit**—Prices continue to slide following auto list closings at the end of last month. Dealers and brokers say only token orders are in the market. They expect the price slide to continue through the month as yards try to work off inventories prior to yearend tax counts in this area.

• **Cincinnati**—Prices are off $2 a ton from month-ago levels on purchases by a local mill. No. 1 heavy melting is quoted $22.50-$23.50 by brokers, down $1.50, and other grades are down $1 to $2 a ton in brokers' lists. One area mill is out of the market this month. This is the third straight month that particular mill has not acquired dealer scrap.

• **St. Louis**—Buying is limited, and for all practical purposes the market is at a standstill. One major open hearth steel mill is buying on

(*Please turn to Page* 168)

Iron and Steel Scrap

Consumer prices per gross ton, except as otherwise noted, including brokers' commission, as reported to STEEL, Nov. 2, 1960. *Changes shown in italics.*

STEELMAKING SCRAP COMPOSITE

Nov. 2	$29.17
Oct. 26	30.17
Oct. Avg.	30.04
Nov. 1959	44.33
Nov. 1955	46.08

Based on No. 1 heavy melting grade at Pittsburgh, Chicago, and eastern Pennsylvania.

PITTSBURGH

No. 1 heavy melting	*26.00-27.00*
No. 2 heavy melting	*21.00-22.00*
No. 1 dealer bundles	*27.00-28.00*
No. 2 bundles	*20.00-21.00*
No. 1 busheling	*26.00-27.00*
No. 1 factory bundles	*30.00-31.00*
Machine shop turnings	*11.00-12.00*
Mixed borings, turnings	*11.00-12.00*
Short turnings	*15.00-16.00*
Cast iron borings	*15.00-16.00*
Cut structurals:	
2 ft and under	33.00-34.00
3 ft and under	32.00-33.00
Heavy turnings	27.00-28.00
Punchings & plate scrap	*34.00-35.00*
Electric furnace bundles	*31.00-32.00*

Cast Iron Grades

No. 1 cupola	*34.00-35.00*
Stove plate	32.00-33.00
Unstripped motor blocks	22.00-23.00
Clean auto cast	*34.00-35.00*
Drop broken machinery	47.00-48.00

Railroad Scrap

No. 1 R.R. heavy melt.	*31.00-32.00*
Rails, 2 ft and under	48.00-49.00
Rails, 18 in. and under	49.00-50.00
Random rails	44.00-45.00
Angles, splice bars	40.00-41.00
Railroad specialties	38.00-39.00
Rails, rerolling	53.00-54.00

Stainless Steel Scrap

18-8 bundles & solids	175.00-180.00
18-8 turnings	95.00-100.00
430 bundles & solids	90.00-95.00
430 turnings	50.00-55.00

CHICAGO

No. 1 hvy melt., indus.	*27.00-28.00*
No. 1 hvy melt., dealer	*25.00-26.00*
No. 2 hvy melting	*23.00-24.00*
No. 1 factory bundles	*29.00-30.00*
No. 1 dealer bundles	*26.00-27.00*
No. 2 bundles	16.00-17.00
No. 1 busheling, indus.	*27.00-28.00*
No. 1 busheling, dealer	*25.00-26.00*
Machine shop turnings	11.00-12.00
Mixed borings, turnings	13.00-14.00
Shovel turnings	13.00-14.00
Cast iron borings	13.00-14.00
Cut structurals, 3 ft	30.00-31.00
Punchings & plate scrap	32.00-33.00

Cast Iron Grades

No. 1 cupola	36.00-37.00
Stove plate	30.00-31.00
Unstripped motor blocks	28.00-29.00
Clean auto cast	41.00-42.00
Drop broken machinery	41.00-42.00

Railroad Scrap

No. 1 R.R. heavy melt.	*29.00-30.00*
R.R. malleable	40.00-41.00
Rails, 2 ft and under	42.00-43.00
Rails, 18 in. and under	43.00-44.00
Angles, splice bars	37.00-38.00
Axles	48.00-49.00
Rails, rerolling	46.00-47.00

Stainless Steel Scrap

18-8 bundles, solids	160.00-165.00
18-8 turnings	*90.00-95.00*
430 bundles & solids	75.00-80.00
430 turnings	40.00-45.00

DETROIT

(Brokers' buying prices; f.o.b. shipping point)

No. 1 heavy melting	*18.00-19.00*
No. 2 heavy melting	*13.00-14.00*
No. 1 bundles	*20.00-21.00*
No. 2 bundles	*10.00-11.00*
No. 1 busheling	*17.00-18.00*
Machine shop turnings	*6.50-7.50*
Mixed borings, turnings	*8.00-9.00*
Shovel turnings	*8.00-9.00*

Cast Iron Grades

No. 1 cupola	*29.00-30.00*
Stove plate	*23.00-24.00*
Heavy breakable	*22.00-23.00*
Unstripped motor blocks	18.00-19.00
Charging box cast	*23.00-24.00*
Clean auto cast	*34.00-35.00*

CLEVELAND

No. 1 heavy melting	*23.00-24.00*
No. 2 heavy melting	*19.00-20.00†*
No. 1 factory bundles	*27.00-28.00*
No. 1 bundles	*23.00-24.00*
No. 2 bundles	16.00-17.00
No. 1 busheling	*23.00-24.00*
Machine shop turnings	10.00-11.00
Shovel turnings	14.00-15.00
Mixed borings, turnings	14.00-15.00
Cast iron borings	14.00-15.00
Cut foundry steel	*28.00-29.00*
Cut structurals, plate 2 ft and under	*31.00-32.00*
Low phos. punchings & plate	*26.00-27.00*
Alloy free, short shovel turnings	14.00-15.00
Electric furnace bundles	*24.00-25.00*

Cast Iron Grades

No. 1 cupola	*37.00-38.00*
Charging box cast	*24.00-25.00*
Heavy breakable cast	26.00-27.00
Stove plate	34.00-35.00
Unstripped motor blocks	28.00-29.00
Brake shoes	35.00-36.00
Clean auto cast	43.00-44.00
Burnt cast	34.00-35.00
Drop broken machinery	*42.00-43.00*

Railroad Scrap

R.R. malleable	*43.00-44.00*
Rails, 2 ft and under	*45.00-46.00*
Rails, 18 in. and under	*45.00-46.00*
Rails, random lengths	*38.00-39.00*
Cast steel	32.00-33.00
No. 1 railroad cast	*42.00-43.00*
Railroad specialties	37.00-38.00
Angles, splice bars	*36.00-37.00*
Rails, rerolling	51.00-52.00

Stainless Steel Scrap (Brokers' buying prices; f.o.b. shipping point)

18-8 bundles, solids	160.00-165.00
18-8 turnings	70.00-75.00
430 clips, bundles, solids	75.00-80.00
430 turnings	20.00-30.00†

YOUNGSTOWN

No. 1 heavy melting	*26.00-27.00*
No. 2 heavy melting	20.00-21.00
No. 1 busheling	*26.00-27.00*
No. 1 bundles	*26.00-27.00*
No. 2 bundles	17.00-18.00
Machine shop turnings	12.00-13.00
Shovel turnings	17.00-18.00
Cast iron borings	17.00-18.00
Low phos.	27.00-28.00
Electric furnace bundles	27.00-28.00

Railroad Scrap

No. 1 R.R. heavy melt.	*26.00-27.00*

BUFFALO

No. 1 heavy melting	*25.00-26.00*
No. 2 heavy melting	*20.00-21.00*
No. 1 bundles	*25.00-26.00*
No. 2 bundles	*17.00-18.00*
No. 1 busheling	*25.00-26.00*
Shovel turnings	*14.00-15.00*
Machine shop turnings	*10.00-11.00*
Cast iron borings	*12.00-13.00*
Low phos. structurals and plate, 2 ft and under	*34.00-35.00*

Cast Iron Grades (F.o.b. shipping point)

No. 1 cupola	*38.00-39.00*
No. 1 machinery	*45.00-46.00*

Railroad Scrap

Rails, random lengths	*37.00-38.00*
Rails, 3 ft and under	*43.00-44.00*
Railroad specialties	*36.00-37.00*

CINCINNATI

(Brokers' buying prices; f.o.b. shipping point)

No. 1 heavy melting	*22.50-23.50*
No. 2 heavy melting	*19.50-20.50*
No. 1 bundles	*22.50-23.50*
No. 2 bundles	*15.00-16.00*
No. 1 busheling	*22.50-23.50*
Machine shop turnings	8.00-9.00
Mixed borings, turnings	8.00-9.00
Shovel turnings	*10.00-11.00*
Cast iron borings	*10.00-11.00*
Low phos. 18 in.	*31.00-32.00*

Cast Iron Grades

No. 1 cupola	*35.00-36.00*
Heavy breakable cast	29.00-30.00
Charging box cast	*34.00-35.00*
Drop broken machinery	*44.00-45.00*

Railroad Scrap

No. 1 R.R. heavy melt.	*28.00-29.00*
Rails, 18 in. and under	*44.00-45.00*
Rails, random lengths	*36.00-37.00*

PHILADELPHIA

No. 1 heavy melting	34.00
No. 2 heavy melting	30.00
No. 1 bundles	35.00
No. 2 bundles	*19.00*
No. 1 busheling	35.00
Electric furnabe bundles	36.00
Mixed borings, turnings	17.00†
Shovel turnings	*19.00*
Machine shop turnings	*13.00*
Heavy turnings	26.00†
Structurals & plates	37.00-39.00
Couplers, springs, wheels	39.00
Rail crops, 2 ft & under	48.00-50.00

Cast Iron Grades

No. 1 cupola	*38.00*
Heavy breakable cast	37.00
Drop broken machinery	48.00-49.00
Malleable	46.00†

NEW YORK

(Brokers' buying prices)

No. 1 heavy melting	*27.00-28.00*
No. 2 heavy melting	*18.00-19.00*
No. 1 bundles	*27.00-28.00*
No. 2 bundles	*13.00-14.00*
Machine shop turnings	*4.00-4.50†*
Mixed borings, turnings	*4.50-5.00†*
Shovel turnings	*6.00-7.00†*
Low phos. structurals & plates	*31.00-32.00†*

Cast Iron Grades

No. 1 cupola	*34.00-35.00*
Unstripped motor blocks	*23.00-24.00*
Heavy breakable	*28.00-29.00*

Stainless Steel

18-8 sheets, clips, solids	*150.00-155.00*
18-8 borings, turnings	*75.00-80.00*
410 sheets, clips, solids	50.00-55.00
430 sheets, clips, solids	60.00-65.00

BOSTON

(Brokers' buying prices; f.o.b. shipping point)

No. 1 heavy melting	23.00-24.00
No. 2 heavy melting	19.00-20.00
No. 1 bundles	23.00-24.00
No. 1 busheling	*23.00-24.00*
Machine shop turnings	5.00-6.00
Shovel turnings	9.00-9.50
No. 1 cast	39.00-40.00
Mixed cupola cast	30.00-30.50
No. 1 machinery cast	40.00-42.00

BIRMINGHAM

No. 1 heavy melting	30.00-31.00
No. 2 heavy melting	22.00-23.00
No. 1 bundles	29.00-30.00
No. 2 bundles	20.00-21.00
No. 1 busheling	29.00-30.00
Cast iron borings	10.00-11.00
Machine shop turnings	17.00-18.00
Shovel turnings	19.00-20.00
Bar crops and plate	36.00-37.00
Structurals & plate	36.00-37.00
Electric furnace bundles	31.00-32.00
Electric furnace:	
3 ft and under	*33.00-34.00*
2 ft and under	*34.00-35.00*

Cast Iron Grades

No. 1 cupola	45.00-46.00
Stove plate	45.00-46.00
Unstripped motor blocks	33.00-34.00
No. 1 wheels	34.00-35.00

Railroad Scrap

No. 1 R.R. heavy melt.	32.00-33.00
Rails, 18 in. and under	45.00-46.00
Rails, random lengths	39.00-40.00
Angles, splice bars	37.00-38.00

ST. LOUIS

(Brokers' buying prices)

No. 1 heavy melting	28.00
No. 2 heavy melting	26.00
No. 1 bundles	30.00
No. 2 bundles	19.00
No. 1 busheling	30.00
Machine shop turnings	7.50
Shovel turnings	9.50

Cast Iron Grades

No. 1 cupola	40.00
Charging box cast	35.00
Heavy breakable cast	33.00
Unstripped motor blocks	35.00
Clean auto cast	40.00
Stove plate	36.00

Railroad Scrap

No. 1 R.R. heavy melt.	30.00
Rails, random lengths	35.00
Rails, rerolling	48.00
Rails, 18 in. and under	*39.00*
Angles, splice bars	35.00

HOUSTON

(Brokers' buying prices; f.o.b. car)

No. 1 heavy melting	*33.00*
No. 2 heavy melting	29.00
No. 1 bundles	32.00
No. 2 bundles	20.00
Machine shop turnings	nom.
Low phos. plate & structurals:	
3 ft	35.00
2 ft and under	*37.00-38.00*

Cast Iron Grades

No. 1 cupola	34.00-34.50
Heavy breakable	25.00
Foundry malleable	29.00-30.00†
Unstripped motor blocks	28.00-28.50

Railroad Scrap

No. 1 R.R. heavy melt.	*33.00-34.00*

LOS ANGELES

No. 1 heavy melting	30.00*
No. 2 heavy melting	27.00†
No. 1 bundles	25.00*
No. 2 bundles	17.00-19.00*
Machine shop turnings	12.00†
Shovel turnings	13.00†
Cast iron borings	13.00†
Cut structurals and plate 1 ft and under	44.00†

Cast Iron Grades

No. 1 cupola	39.00-44.00†

Railroad Scrap

No. 1 R.R. heavy melt.	40.00†

PORTLAND, OREG.

(Prepared, f.o.b. car)

No. 1 heavy melting	39.00
No. 2 heavy melting	36.00
No. 2 bundles	21.00
Shovel turnings	15.00
Electric furnace bundles	48.00

Cast Iron Grades

No. 1 cupola	35.00
Heavy breakable	33.00
Unstripped motor blocks	33.00
Stove plate (f.o.b. plant)	20.00

SEATTLE

(Prepared, f.o.b. car)

No. 1 heavy melting	38.50
No. 2 (prepared for shears)	30.00
No. 1 hvy (unprepared)	35.00
No. 2 heavy melting	35.50
No. 2 hvy (unprepared)	33.00
No. 1 (prepared for shears)	33.00
No. 2 bundles	23.00
Shovel turnings	15.00
Electric furnace bundles	48.00

Cast Iron Grades

No. 1 cupola	35.00
Heavy breakable cast	36.00
Unstripped motor blocks	33.00
Stove plate (f.o.b. plant)	20.00

SAN FRANCISCO

No. 1 heavy melting	32.00
No. 2 heavy melting	29.00
No. 1 bundles	27.00-28.00
No. 2 bundles	18.00
Machine shop turnings	14.00
Mixed borings, turnings	14.00
Cast iron borings	14.00
Heavy turnings	14.00
Shovel turnings	14.00
Cut structurals, 3 ft	40.00

Cast Iron Grades

No. 1 cupola	46.00-48.00
Charging box cast	34.00
Stove plate	34.00
Heavy breakable cast	28.00
Unstripped motor blocks	31.00
Clean auto cast	40.00
Drop broken machinery	45.00-46.00
No. 1 wheels	34.00

HAMILTON, ONT.

(Brokers' buying prices; net tons)

No. 1 heavy melting	25.80
No. 2 hvy melt, 2 ft & under	25.50
No. 1 bundles	25.80
No. 2 bundles	19.00
Mixed steel scrap	16.00
Mixed borings, turnings	12.00
Busheling, new factory: Prepared	25.50
Unprepared	20.45
Shovel turnings	12.00

Cast Iron Grades‡

No. 1 machinery cast	43.00

*For export add $4 dock charges.
†Nominal.
‡F.o.b. Hamilton, Ont.

NORTHERN Cranes for scrap yard handling

These magnet handling, heavy duty Northern yard cranes handle scrap continuously in many scrap yards, foundries, steel mills and industrial plants.

NORTHERN CRANES — in this and many similar installations — assure: (1) higher operating speeds for faster turnover of salvage materials as related to yard space; (2) dependable, continuous operation with minimum service and maintenance because of heaviest duty type fittings and equipment; (3) safer, more effective crane operation because of better visibility from Northern's Clear Vision Control Cab; and (4) lower cost operation because oil bath lubrication minimizes crane idle time and wear in load bearing parts.

This 15-ton, 80-foot span, magnet handling crane has A.C., full magnetic, counter torque lowering with motor generator set mounted on crane footwalk.

MATERIAL HANDLING EQUIPMENT BY NORTHERN

Sales representatives in all principal cities.

NORTHERN ENGINEERING WORKS
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SE-2021

look overhead . . . see "NORTHERN"

Fewer Sales, Weak Prices Hurt Profits

THE NO. 1 PROBLEM in the nonferrous industry can be covered in a single word, "profits"! In the first nine months of this year, earnings of most producers and fabricators were down (see table at right). Special conditions account for the sprinkling of firms that made a better showing.

If anything, the profit pinch has tightened during the year. The third quarter was the worst so far, and nonferrous executives see little relief in sight.

Earnings, Nine Months Ended Sept. 30

	1960	1959
Revere Copper & Brass Inc.	$5,246,514	$7,658,037
Bridgeport Brass Co.	2,148,364	5,415,155
Anaconda Wire & Cable Co.	556,000	2,759,205
Calumet & Hecla Inc.	2,587,766	3,607,387
Kennecott Copper Corp.	62,825,402	58,696,257
Aluminum Co. of America	30,279,511	41,497,805
Kaiser Aluminum & Chemical Corp.	17,539,000	15,236,000
Reynolds Metals Co.	19,072,000	31,406,000
Bohn Aluminum & Brass Corp.	928,846	978,505
Olin Mathieson Chemical Corp.	26,437,000	26,752,000
St. Joseph Lead Co.	2,092,520	4,570,111
National Lead Co.	12,246,775	12,170,057

• **Cost-Price Squeeze** — The most obvious reason for smaller profits is the dip in sales which reflects the general slowdown in industrial activity since the first quarter. But many companies with better sales than last year's are reporting fewer dollars in the profit column.

• **Why?**—First: Costs are up. Many companies have been hit with higher labor charges; some will run into additional increases in 1961. Many other costs are also up—from transportation to services.

Second, and most important for the bulk of nonferrous companies: Overcapacity in all major metals.

Too much production led to the recent 3-cent-a-pound drop in the price of copper. The brass mill industry could produce twice as much tonnage as it is turning out now. One-third more aluminum could be placed before the U. S. consumer if demand were present. Magnesium capacity can take care of any foreseeable demand.

Result: Sharply intensified competition which has sent nonferrous companies scrambling for the available sales dollar. Common complaint: Companies take an order at cost, or even under cost, to keep volume up.

Third factor: Increasing competition from foreign companies is intensifying the scramble for markets. Low priced imports are taking about 10 per cent of the domestic market for brass mill products. They're hurting makers of lead and zinc fabricated products. They have caused disruptions in aluminum.

• **Price Pruning**—Those things add up to a hectic market. The inevitable result has been the greatest amount of price shading in recent memory.

Aluminum extruders say little, if any, profits are being made in their business today. In the whole area of aluminum mill products, profits are paper thin. Magnesium fabricators say price cutting is worse than it has ever been. It's equally severe in many lead and zinc items. Brass mill product prices have gone through a year of wide scale dislocations. Recently, the mills bumped prices across the board by 0.25 to 1 cent a pound. The nudge will help the fourth quarter profit picture, say mill executives,

(*Please turn to Page* 168)

NONFERROUS PRICE RECORD

	Nov. 2 Price	Last Change	Previous Price	Oct. Avg	Sept. Avg	Nov., 1959 Avg
Aluminum	26.00	Dec. 17, 1959	24.70	26.000	26.000	24.700
Copper	30.00	Oct. 13, 1960	31.00–33.00	30.760	33.000	32.420
Lead	11.80	Dec. 21, 1959	12.30	11.800	11.800	12.800
Magnesium	35.25	Aug. 13, 1956	33.75	35.250	35.250	35.250
Nickel	74.00	Dec. 6, 1956	64.50	74.000	74.000	74.000
Tin	103.875	Nov. 2, 1960	104.00	103.445	102.355	100.985
Zinc	13.00	Jan. 8, 1960	12.50	13.000	13.000	12.500

Quotations in cents per pound based on: COPPER, mean of primary and secondary, deld. Conn. Valley; LEAD, common grade, deld. St. Louis; ZINC, prime western, East St. Louis; TIN, Straits, deld. New York; NICKEL, electrolytic cathodes, 99.9%, base size at refinery, unpacked; ALUMINUM, primary ingot, 99.5+%, f.o.b. customer custody; MAGNESIUM, pig, 99.8%, Velasco, Tex.

part of a COMPLETE efficiency-proved line . . .

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Consistently superior performance because they're made in the right grain and grade combinations for the jobs they have to do. *Mechanical accuracy* you can count on for true concentricity, precise wheel shape and top cutting efficiency. *Stainless steel mandrels securely bonded to wheel* . . . specially fluted . . . guaranteed not to come loose or pull off.

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WEST COAST PLANT: EL MONTE, CALIF.—BRANCHES: CHICAGO • DETROIT • LOS ANGELES • PHILADELPHIA • PORTLAND, ORE. • SAN FRANCISCO SHREVEPORT—IN CANADA: GRINDING WHEELS DIVISION, SIMONDS CANADA SAW CO., LTD., BROCKVILLE, ONTARIO • ABRASIVE PLANT, ARVIDA, QUEBEC

Nonferrous Metals

Cents per pound, carlots except as otherwise noted.

PRIMARY METALS AND ALLOYS

Aluminum: 99.5%, 50 lb ingots, 26.00, 30,000 lb or more, f.o.b. customer custody.

Aluminum Alloy: No. 13, 25.90; No. 43, 26.20; No. 195, 27.60; No. 214, 31.50; No. 356, 26.80, 50 lb ingots.

Antimony: R.M.M. brand, 99.5%, 29.00; Lone Star brand, 29.50, f.o.b. Laredo, Tex., in bulk. Foreign brands, 99.5%, 25.50-26.00, New York, duty paid, 10,000 lb or more.

Beryllium: 97% lump or beads, $70.00 per lb, f.o.b. Cleveland or Reading, Pa.

Beryllium Aluminum: 5% Be, $65 per lb of contained Be, with balance as Al at market price, f.o.b. shipping point.

Beryllium Copper: 3.75-4.75% Be, $43 per lb of contained Be, with balance as Cu at market price on shipment date, f.o.b. shipping point.

Bismuth: $2.25 per lb, ton lots.

Cadmium: Sticks and bars, $1.60 per lb deld.

Cobalt: 99+%, $1.50 per lb for 500-lb keg; $1.52 per lb for 100 lb case; $1.57 per lb under 100 lb.

Columbium: Powder, $25-35 per lb nom.

Copper: Electrolytic, 30.00 deld.; custom smelters, 30.00; lake, 30.00 deld.; fire refined, 29.75 deld.

Germanium: First reduction, ingots, less than 1 kg, 36.00-37.50 per gram; 1-10 kg, 30.50-32.00 per gram; 10 or more, 28.10-29.99 per gram; intrinsic under 10 kg, 31.95 per gram; 10 kg or 29.95 per gram.

Gold: U. S. Treasury

Indium: 99.9%, $2.25 per oz.

Iridium: $70-75 per troy oz nom.

Lead: Common, 11.80; chemical, 11.90; corroding, 11.90, St. Louis. New York basis, add 0.20.

Lithium: 1 lb or 2 lb ingots, less than 24 lb, $11 per lb deld.; 24-99 lb, $9.50; 100-499 lb, $9.25; 450 lb or more, $9 per lb, delivered.

Magnesium: Pig, 35.25; ingot, 36.00 f.o.b. Velasco, Tex., 1.3 in. diam. x 12 in. sticks, 57.00 f.o.b. Madison, Ill.

Magnesium Alloy: AZ91A (diecasting), 40.75; AZ63A, AZ92A, AZ91C (sand casting), 40.75, f.o.b. Velasco, Tex.

Mercury: Open market, spot, New York, $208-210 per 75 lb flask.

Molybdenum: Unalloyed forging billets, 4.125-8.5 in. diam., 50-4999 lb, $8.15-11.50 per lb, depending on quantity; 5000 lb or more, $8 per lb, f.o.b. Coldwater, Mich.

Nickel: Electrolytic cathodes, sheets (4 x 4 in. and larger), unpacked, 74.00; 10-lb pigs, unpacked, 78.25; "XX" nickel shot, 79.50; "F" nickel shot for addition to cast iron, in kegs, 74.50; "F" nickel, 5 lb ingots, 75.50. Prices f.o.b. Port Colborne, Ont., including import duty. New York basis, add 1.01. Nickel oxide sinter at Buffalo, New York, or other established U. S. ports of entry, contained nickel, 69.60.

Osmium: $70-90 per troy oz nom.

Palladium: $24-26 per troy oz.

Platinum: $82-85 per troy oz from refineries.

Radium: $16-21.50 per mg radium content, depending on quantity.

Rhodium: $137-140 per troy oz.

Ruthenium: $45-50 per troy oz.

Selenium: $6.50-7 per lb, commercial grade.

Silver: Open market, 91.375 per troy oz.

Sodium: Solid pack, c.l., 19.50; l.c.l., 20.00; brick, c.l., 21.00; l.c.l., 21.50; tank car, 17.00.

Tantalum: Melting stock, $35 per lb; rod, $60 per lb nom; sheet, $55 per lb nom.

Tellurium: $3.50-5 per lb, 100 lb or more.

Thallium: $7.50 per lb.

Tin: Straits, N. Y., spot, 104.00; prompt, 103.75.

Titanium: Sponge, 99.3+% grade A-1, ductile (0.3% Fe max.), $1.60 per lb; grade A-2 (0.5% Fe max.), $1.50 per lb.

Tungsten: Powder, 98.8%, carbon reduced, 1000-lb lots, $2.75-2.85 per lb nom., f.o.b. shipping point; less than 1000 lb, add 15.00; 99+% hydrogen reduced, $3.10-4.00.

Zinc: Prime western, 13.00; brass special, 13.25; intermediate, 13.00. East St. Louis, freight allowed over 0.50 per lb, New York basis, add 0.50. High grade, 14.35; special high grade, 14.50 deld. Diecasting alloy ingot No. 3, 16.25; No. 2, 16.75; No. 5, 16.50 deld.

Zirconium: Reactor grade sponge, 100 lb or less, $8-8.50 per lb; 100-500 lb, $7.25-7.50 per lb, 500-1000 lb, $6.50-7.25; over 1000 lb, $6.50 per lb.

(Note: Chromium, manganese, and silicon metals are listed in ferroalloy section.)

SECONDARY METALS AND ALLOYS

Aluminum Ingot: Piston alloys, 25.00-26.00; No. 12 foundry alloy (No. 2 grade), 22.75; 5% silicon alloy, 0.60 Cu max., 24.00; 13 alloy, 0.60 Cu max., 24.00; 195 alloy, 25.75; 108 alloy, 23.25. Steel deoxidizing grades, notch bars, granulated or shot: Grade 1, 23.75; grade 2, 22.50; grade 3, 21.50; grade 4, 21.00.

Brass Ingot: Red brass, No. 115, 28.25; tin bronze, No. 225, 38.00; No. 245, 32.50; high-leaded tin bronze, No. 305, 32.75; No. 1 yellow, No. 405, 23.50; manganese bronze, No. 421, 27.50.

Magnesium Alloy Ingot: AZ63A, 37.50; AZ91B, 37.25; AZ91C, 41.25; AZ92A, 37.50.

NONFERROUS PRODUCTS

BERYLLIUM COPPER

(Base prices per lb, plus mill extras, 2000 to 5000 lb; nom. 1.9% Be alloy.) Strip, $1.945, f.o.b. temple, Pa., or Reading, Pa.; rod, bar, wire, $1.945, f.o.b. Temple, Pa.

COPPER WIRE

Bare, soft, f.o.b. eastern mills, 20,000-lb lots, 35.35; l.c.l., 35.98. Weatherproof, 20,000-lb lots, 36.30; l.c.l., 37.05.

LEAD

(Prices to jobbers, f.o.b. Buffalo, Cleveland, Pittsburgh.) Sheets, full rolls, 140 sq ft or more, $17.50 per cwt; pipe, full coils, $17.50 per cwt; traps and bends, list prices plus 30%.

TITANIUM

(Prices per lb, 10,000 lb and over, f.o.b. mill.) Sheet and strip, $6.75-15.50; sheared mill plate, $5.25-9.00; wire, $5.55-9.50; forging billets, $3.20-4.75; hot-rolled and forged bars, $3.80-6.25.

ZINC

(Prices per lb, c.l., f.o.b. mill.) Sheets, 28.00; ribbon zinc in coils, 22.50; plates, 21.50.

ZIRCONIUM

Plate, $14.00-25.00; H.R. strip, $14.00-22.90; C.R. strip, $16.00-35.00; forged or H.R. bars, $11.00-17.40.

NICKEL, MONEL, INCONEL

	"A" Nickel	Monel	Inconel
Sheets, C.R.	138	120	138
Strip, C.R.	124	108	138
Plate, H.R.	130	110	126
Rod, Shapes, H.R.	107	89	109
Seamless Tubes	157	129	200

ALUMINUM

(Selected products and sizes)

Flat Sheets: 1100, 3003, and 5005, mill finish, 30,000 lb base f.o.b. customer custody.

Thickness Range (in.)	Width (in.)	Length Range(in.)	Price Range
0.250-0.136	24-72	72-180	45.40-48.00
0.136-0.096	24-72	72-180	45.90-48.80
0.096-0.077	24-72	72-180	46.40-50.30
0.077-0.068	24.72	72-180	46.90-52.10
0.068-0.061	24-72	72-180	46.90-55.00
0.061-0.048	24-72	72-180	47.40-57.70
0.048-0.038	24-72	72-180	47.90-60.50
0.038-0.030	24-72	72-180	48.40-65.30
0.030-0.024	24-72	72-180	48.90-67.20
0.024-0.019	24.60	72-180	49.40-59.90
0.019-0.017	24-48	72-144	50.30-57.00
0.017-0.015	24-48	72-144	51.20-58.00
0.015-0.014	24-36	72-144	52.30
0.014-0.012	24-36	72-144	53.50
0.012-0.011	24-36	72-114	54.60
0.011-0.0095	24-46	72-144	56.20
0.0095-0.0085	24.36	72-96	57.50
0.0085-0.0075	24-36	72-96	59.20
0.0075-0.007	24-36	72-96	60.80
0.007-0.006	24-36	72-96	62.50

ALUMINUM (continued)

Plates and circles: Thickness, 0.25-3 in.; width or diam., 24-60 in.; lengths, 72-240 in., mill finish.

Alloy	Plate Base	Circle Base
1100, 3003-F	44.60	50.90
5050-F	45.70	50.50
3004-F	46.70	52.40
5052-F	47.30	53.10
6061-T6	47.80	53.90
2024-T4*	51.80	58.90
7075-T6*	60.50	67.90

*24-48 in. width or diam., 72-180 in. lengths.

Screw Machine Stock: 30,000 base, 12 ft lengths

Diam	Round		Hexagonal	
(in.)*	2011-T3	2017-T4	2011-T3	2017-T4
0.125	74.90	77.30	....	....
0.188	63.20	63.20	....	80.10
0.250	60.00	62.60	72.70	74.10
0.375	59.20	63.80	71.00	72.00
	2011-T3	2017-T451	2011-T3	2017-T451
0.500	59.20	63.80	71.00	72.00
0.625	59.20	63.80	67.80	67.90
0.750	57.70	62.00	61.60	63.80
0.875	57.70	62.00	61.60	63.80
1.000	57.70	62.00	61.60	63.80
1.125	56.30	59.50	59.50	61.50
1.250	55.30	59.50	59.50	61.50
1.375	55.30	59.50	59.50	61.50
1.500	55.30	59.50	59.50	61.50
1.625	53.00	56.70	....	59.30
1.750	53.00	56.70	58.30	59.30
1.875	53.00	56.70	....	59.30
2.000	53.00	56.70	58.30	59.30
2.250	51.50	55.00	....	59.30
2.500	51.50	55.00	....	59.30
2.750	49.90	53.20	....	59.30
3.000	49.00	53.20	....	59.30
3.250	....	53.20	....	....
3.375	....	53.20	....	....

*Selected sizes.

Forging Stock: Round, Class 1, random lengths, diam., 0.375-8 in., "F" temper; 2014, 47.50-57.60; 6061, 43.50-57.60; 7075, 61.80-71.90; 7079, 66.80-76.90.

Pipe: ASA schedule 40, alloy 6063-T6, 3-40 ft lengths, plain ends, 90,000 lb base, dollars per ft. Nominal pipe sizes: 1 in., 32.00; 1¼ in., 43.40; 1½ in., 51.80; 2 in., 62.60; 3 in., 124.95; 4 in., 171.80; 5 in., 233.15; 6 in., 308.55; 8 in., 464.35; 10 in., 716.25 (3-24 ft lengths).

Extruded Solid Shapes:

Factor	Alloy 6063-T5	Alloy 6062-T6
1-14	45.30-46.80	54.00-60.00
15-17	45.30-46.80	56.50-61.80
18-23	45.80-47.50	58.60-67.60
24-32	45.80-47.50	66.80-81.50
33-38	49.50-52.20	85.10-96.60
39-44	59.80-63.60	102.00-124.00

MAGNESIUM

Sheets and Plates: AZ31B standard grade, .032 in., 103.10; .081 in., 77.90; .125 in., 70.40; .188 in., 69.00; .250-2.00 in., 67.90. AZ31B spec. grades, .032 in., 171.30; .081 in., 108.80; .125 in., 98.10; .188 in., 95.70; .250-2.00 in., 93.30. Tread plate, 60-192 in. lengths, 24.72 in. widths; .125 in., 74.90; .188 in., 71.70-72.70; .25-.75 in., 70.60-71.60. Tooling plate, 0.25-3.00 in., 73.00.

Extruded Solid Shapes:

Factor	Com. Grade (AZ31C)	Spec. Grade (AZ31B)
6-8	66.30-67.60	84.60-87.40
12-14	65.30-67.60	85.70-88.00
24-26	66.10-68.40	90.60-91.30
36-38	71.50-75.30	104.20-106.30

NONFERROUS SCRAP

DEALERS' BUYING PRICES

Copper and Brass: No. 1 heavy copper and wire, 22.75-23.25; No. 2 heavy copper and wire, 20.50-21.00; light copper, 18.00-18.50; No. 1 composition red brass, 18.00-18.50; No. 1 com-

BRASS MILL PRICES

MILL PRODUCTS a

	Strip, Plate	Rod	Wire	Seamless Tubes	SCRAP ALLOWANCES e (Based on copper at 30.00c) Clean Heavy	Rod Ends	Clean Turnings
Copper	55.13b	52.36c	....	56.32	26.000	26.000	25.250
Yellow Brass	49.27	34.88d	49.56	53.43	20.375	19.625	18.625
Low Brass, 80%	51.75	51.69	52.04	55.81	22.500	22.250	21.750
Red Brass, 85%	52.62	52.56	52.91	56.68	23.250	23.000	22.500
Com. Bronze, 90%	54.03	53.97	54.32	57.84	24.000	23.750	23.250
Manganese Bronze	57.82	51.42	61.19	....	19.250	19.000	18.375
Muntz Metal	52.14	47.45	....	....	19.475	19.125	18.625
Naval Brass	54.08	47.89	60.39	58.24	19.125	18.875	18.375
Silicon Bronze	60.48	59.67	59.77	63.23	25.500	25.250	24.500
Nickel Silver, 10%	64.68	67.01	66.76	....	25.125	24.875	12.562
Phos. Bronze, A-5%	75.70	76.20	75.45	77.63	27.125	26.875	25.875

a. Cents per lb, f.o.b. mill; freight allowed on 50 lb or more. b. Hot-rolled. c. Cold-drawn. d. Free cutting. e. Prices in cents per lb for less than 20,000 lb, f.o.b. shipping point. On lots over 20,000 lb at one time, of any or all kinds of scrap, add 1 cent per lb.

position turnings, 17.00-17.50; new brass clippings, 15.50-16.00; light brass, 12.50-13.00; heavy yellow brass, 13.50-14.00; new brass rod ends, 14.50-15.00; auto radiators, unsweated, 14.00-14.50; cocks and faucets, 15.50-16.00; brass pipe, 15.50-16.00.

Lead: Soft scrap lead, 7.75-8.00; battery plates, 3.00; linotype and stereotype, 9.00-9.50; electrotype, 8.00-8.25; mixed babbitt, 9.50-10.00.

Monel: Clippings, 23.00-24.00; old sheets, 22.00-23.00; turnings, 16.50-17.50; rods, 22.00-23.00.

Nickel: Sheets and clips, 50.00-51.00; rolled anodes, 50.00-51.00; turnings, 39.00-41.00; rod ends, 50.00-51.00.

Zinc: Old zinc, 3.00-3.50; new diecast scrap, 4.25-4.50; old diecast scrap, 2.75-3.00.

Aluminum: Old castings and sheets, 11.00-11.50; clean borings and turnings, 6.00-6.50; segregated low copper clips, 13.00-13.50; segregated high copper clips, 12.00-12.50; mixed low copper clips, 12.50-13.00; mixed high copper clips, 12.00-12.50.

(Cents per pound, Chicago)

Aluminum: Old castings and sheets, 10.00-10.50; clean borings and turnings, 7.00-7.50; segregated low copper clips, 15.00-15.50; segregated high copper clips, 13.50-14.00; mixed low copper clips, 12.50-13.00; mixed high copper clips, 12.00-12.50.

(Cents per pound, Cleveland)

Aluminum: Old castings and sheets, 10.00; clean borings and turnings, 8.50; segregated low copper clips, 14.00; segregated high copper clips, 13.00; mixed low copper clips, 13.00; mixed high copper clips, 12.50.

REFINERS' BUYING PRICES

(Cents per pound, carlots, delivered refinery)
Beryllium Copper: Heavy scrap, 0.020-in. and heavier, not less than 1.5% Be, 56.00; light scrap, 51.00; turnings and borings, 36.00.

Copper and Brass: No. 1 heavy copper and wire, 23.75; No. 2 heavy copper and wire, 22.25; light copper, 20.00; refinery brass (60% copper) dry copper content, 20.50.

INGOTMAKERS' BUYING PRICES

Copper and Brass: No. 1 heavy copper and wire, 23.75; No. 2 heavy copper and wire, 22.25; light copper, 20.00; No. 1 composition borings, 19.00; No. 1 composition solids, 19.50; heavy yellow brass solids, 15.00; yellow brass turnings, 14.00; radiators, 16.00.

PLATING MATERIAL

(F.o.b. shipping point, freight allowed on quantities)

ANODES

Cadmium: Special or patented shapes, $1.60.

Copper: Flat-rolled, 47.04; oval, 43.50 5000-10,000 lb; electrodeposited, 39.00, 2000-5000 lb lots; cast, 41.50, 5000-10,000 lb quantities.

Nickel: Depolarized, less than 100 lb, 114.25; 100-499 lb, 112.00; 500-4999 lb, 107.50; 5000-29,999 lb, 105.25; 30,000 lb, 103.00. Carbonized, deduct 3 cents a lb.

Tin: Bar or slab, less than 200 lb, 122.50; 200-499 lb, 121.00; 500-999 lb, 120.50; 1000 lb or more, 120.00.

Zinc: Balls, 20.50; flat tops, 20.50; flats, 23.25; ovals, 22.50, ton lots.

CHEMICALS

Cadmium Oxide: $1.60 per lb in 100-lb drums.

Chromic Acid (flake): 100-2000 lb, 31.00; 2000-10,000 lb, 30.50; 10,000-20,000 lb, 30.00; 20,-000 lb or more, 29.50.

Copper Cyanide: 100-200 lb, 65.90; 300-900 lb, 63.00; 1000-19,000 lb, 61.90.

Copper Sulphate: 100-1900 lb, 15.25; 2000-5900 lb, 13.25; 6000-11,900 lb, 13.00; 12,000-22,900 lb, 12.75; 23,,000 lb or more, 12.25.

Nickel Chloride: 100 lb, 45.00; 200 lb, 43.00; 300 lb, 42.00; 400-4900 lb, 40.00; 5000-9900 lb, 38.00; 10,000 lb or more, 37.00.

Nickel Sulphate: 5000-22,999 lb, 29.00; 23,000-39,900 lb, 28.50; 40,000 lb or more, 28.00.

Sodium Cyanide (Cyanobrik): 200 lb, 23.80; 400-800 lb, 20.80; 1000-4900 lb, 19.80; 5000-19,900 lb, 18.80; 20,000 lb or more, 17.60.

Sodium Stannate: Less than 100 lb, 80.60; 100-600 lb, 71.20; 700-1900 lb, 68.40; 2000-9900 lb, 66.60; 10,000 lb or more, 65.20.

Stannous Chloride (Anhydrous): 25 lb, 156.20; 100 lb, 151.40; 400 lb, 148.90; 800-19,900 lb, 108.00; 20,000 lb or more, 102.00.

Stannous Sulphate: Less than 50 lb, 141.30; 50 lb, 111.30; 100-1900 lb, 109.30; 2000 lb or more, 107.30.

Zinc Cyanide: 100-200 lb, 59.00; 300-900 lb, 57.00.

CLASSIFIED ADVERTISING

FOR SALE

Approximately 8000 Hot-Rolled Steel 16-Ga. Tank Heads.
Will sell at one-half of our original cost.
Per list as follows:

Size	Description	Quan.	Price
12" Dia.	16-Ga. Flat Heads, Flanged	738	$.40 ea.
16½" Dia.	16-Ga. Not Dished, Flanged	947	.46 ea.
18" Dia.	16-Ga. Not Dished, Flanged	393	.51 ea.
18" Dia.	16-Ga. Dished, Flanged	178	.53 ea.
21" Dia.	16-Ga. Dished, Flanged	2362	.65 ea.
21" Dia.	16-Ga. Not Dished, Flanged	2745	.60 ea.

Contact Utica Products Inc.
1101 Burrstone Road
Utica 4, New York

Radial Drill WANTED

4 to 5 Foot Used, Late Model
Send Complete Information to

COULTER & McKENZIE
THE COULTER & McKENZIE MACHINE CO.
35 UNION AVE. ● BRIDGEPORT 7, CONN.
Phone EDison 5-1101

WANTED . . .

1—HYDRAULIC PRESS— 500 ton; 30" to 36" stroke; 36" daylite; bed area 100" x 50/56"

1—ROLLER LEVELER— Capacity 5/16" x 36"/48" steel plate. Seven (7) straightening rolls 5" to 7" diameter and one set of pinch rolls.

2—PLATE SHEARS— Capacity ⅝" x 10' to 16' mild steel, with hold-downs, squaring arms and back gauges.

Please furnish complete details, including year made, model, serial numbers and lowest price.

VALLEY STEEL PRODUCTS CO.
ST. LOUIS 4, MO.
Frank Corgiat
PRospect 3-3020

Representatives Wanted

Representatives
Thirteen Western States
Must have conveyor
and material handling experience
May-Fran Manufacturing Co.
1710 Clarkstone Rd., Cleveland 12, Ohio

CLASSIFIED RATES

All classifications other than "Position Wanted" set solid, 50 words or less $18.00, each additional word .36; all capitals, 50 words or less $21.00, each additional word .45; all capitals leaded, 50 words or less $25.00, each additional word .55. "Position Wanted" set solid, 25 words or less $5.00, each additional word .20; all capitals, 25 words or less $6.50, each additional word .26; all capitals leaded 25 words or less $8.00, each additional word .32. Keyed address takes seven words. Cash with order necessary on "Position Wanted" advertisements. Replies forwarded without charge. Displayed classified rates on request. Address your copy and instructions to STEEL, Penton Building, Cleveland 13, Ohio.

Help Wanted

OPERATING SUPERINTENDENT AND SUPERVISORY PERSONNEL FOR ALUMINUM ROLLING MILL

Expanding primary aluminum producer offers outstanding opportunity for highly experienced operating superintendent for an aluminum rolling mill facility. A strong technical background and supervision record are essential. This new installation will also require experienced first-class operating personnel. For those qualified, these positions offer excellent remuneration and benefits. You are invited to reply in confidence to:

Director of
Professional Personnel
HARVEY ALUMINUM
19200 S. Western Ave.
Torrance, California

ABRASIVES

Experienced shot and grit service man. Contact foundries, steel mills, metalworking plants. Salary and commission.

BOX 880, STEEL
PENTON BLDG. CLEVELAND 13, OHIO

SALES ENGINEER

Should have Electrical or Mechanical Engineering degree. Technical sales experience desirable. Send resume to **Leon H. Becker, Howell Instruments, Inc., 3479 West Vickery Blvd., Fort Worth 7, Texas.**

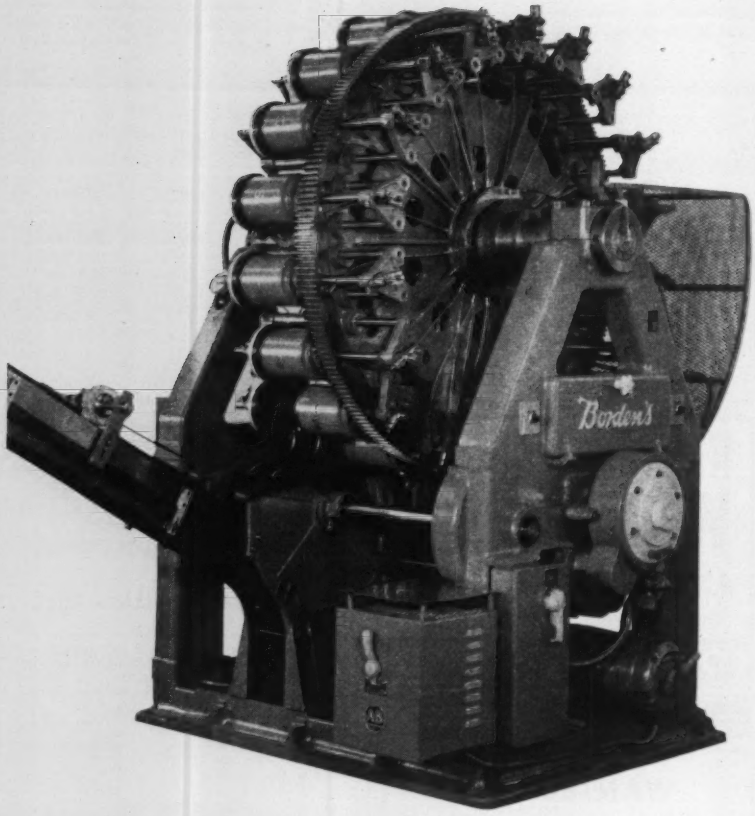
ROLL FORMING SALES

Experienced. Knowledge of California market required. Good income and benefits.

CALIFORNIA STEEL AND TUBE
4000 Noakes Street
Los Angeles 23, California
ANgelus 8-2771

Help Wanted

SALESMAN WANTED — MIDWEST METAL ABRASIVE Company desires salesman between age of 20 and 30 to sell metal industry in New Jersey, eastern Pennsylvania and Maryland. Commission, car and expenses. Furnish background. Interview will be arranged. Reply to Box 879, STEEL, Penton Bldg., Cleveland 13, Ohio.



MAJOR SOURCE

A CASE IN POINT—The new Borden 18 pocket 4 and 5 quart Can Tester is the first pneumatic tester of this type in the world. Fast, automatic, reliable; it depends on sound, wear-resistant castings for dimensional accuracy and stability. Hamilton Foundry supplies 127 castings ranging from 2 pounds to 1300 pounds for this machine. Borden also makes a 9 pocket Tester for cans up to 2½ gallon capacity. In fact, most of the iron castings used in these machines come from Hamilton Foundry, a reliable single source for engineered castings.

When new and unusual design problems arise in selecting metal and casting parts, the skill and integrity of Hamilton Foundry is your best insurance that specifications—and delivery schedules—will be met.

GRAY IRON • ALLOYED IRON • MEEHANITE® • DUCTILE (NODULAR) IRON • NI-RESIST • DUCTILE NI-RESIST • NI-HARD

HAMILTON FOUNDRY INC.

1551 LINCOLN AVENUE • HAMILTON, OHIO • TWinbrook 5-7491

(*Concluded from Page* 164)

but won't begin to call a halt to the shading.

• **No Hikes in Sight**—It's unlikely that you'll see any strengthening in prices over the fourth quarter. The only factor that could bring a rise in the primary metals is greatly improved business, and, so far, the market has given scant indication of moving in that direction. Fabricators say they would like to pep up their shaky price structures but admit such a move is not in sight. That indicates little improvement in profits during the fourth quarter.

"The only thing that gives us hope," says one metalman, "is the knowledge that something will have to give some day. It's elementary arithmetic that with costs going up, and prices being eroded, profits disappear. When enough people realize this fact, the situation will be cleared up."

Scrap . . .

(*Concluded from Page* 161)

a day-to-day basis, but there are no new open orders outstanding. Prices are steady, except for 18 in. rails which are down to $39. Prospects for an early improvement in dedand are not promising.

• **Birmingham**—Prices on electric furnace scrap dropped to $33-$34 last week. Some dealers say business hasn't been so bad in more than ten years. One area steelmaker is holding up shipments on an old contract.

• **Houston**—The market continues weak, and no improvement is indicated over coming weeks. Mexico is buying small lots, but domestic demand is insignificant. No. 1 heavy melting is quoted at $33, down $1 from the last price paid. Railroad heavy melting is also down $1 at $33-$34.

• **Seattle**—Not much scrap is moving here. Exports are the only firming influence. Dealers are stockpiling material for another cargo to Japan. Mills have ample inventories, and no immediate upturn in demand or prices is sighted.

• **San Francisco**—Little scrap is moving despite the recent reductions in prices. Some traders think the market will go lower before stabilizing.

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You May Win $1000 By Reading This Issue of STEEL

See Page 5 Servicenter For Details

STEEL's Big Usership-Idea of-the-Month Contest

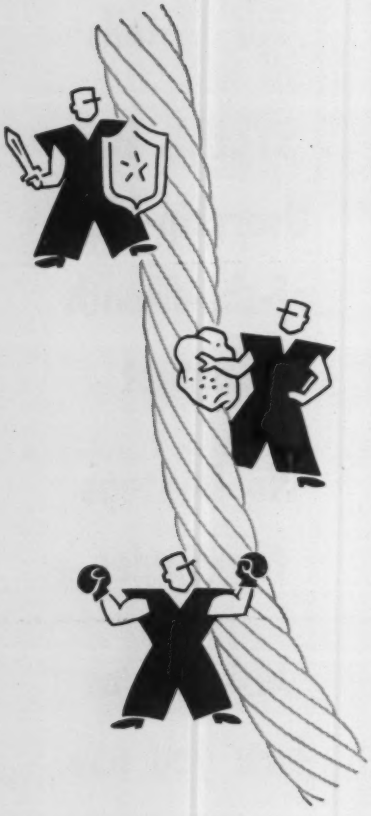
No Boxtops No Jingles

Just tell us how you use articles or advertisements that you see in STEEL

DOUBLE GRAY-X®

...the wire rope with the

EXTRAS



First — because it's made of *extra* improved plow steel — Double Gray-X has *extra* high breaking strength (15% higher than the catalog breaking strength of non-premium ropes of the same construction). Second — due to Wickwire's new wire drawing process — Double Gray-X gives *extra* long service. Double Gray-X has:

MOLECULAR SHIELD

The use of molybdenum disulphide in the wire drawing results in a shield several molecules thick which lubricates the individual wires and prevents them from grinding against each other when the rope operates. Less internal friction means more rope life.

SMOOTHER WIRE SURFACE

Before Double Gray-X, the most carefully drawn rope wire contained minute surface imperfections. Wickwire's new wire drawing technique improves the surface finish. Smooth surfaced wires provide better resistance to fatigue.

EXTRA TOUGHNESS

Molybdenum disulphide lubricates the wires during the drawing process. Less power is required and less heat is generated during this operation. The original inherent toughness of the wires is better preserved.

Double Gray-X is available in many different sizes and constructions. To reduce your operating costs, you should insist on Double Gray-X. For complete information, contact your local Wickwire distributor. We'll be glad to give you his name and address. Write to Wickwire Spencer Steel Division, Wire Rope General Sales Department, P.O. Box 232, Palmer, Mass.

7953

WICKWIRE ROPE · DOUBLE GRAY-X · DOUBLE GRAY-X · A CF&I PRODUCT

WICKWIRE ROPE

THE COLORADO FUEL AND IRON CORPORATION

DENVER • OAKLAND • NEW YORK

CF&I STEEL

evidence of an evolution in steel processing

Here's a demonstration that sparked a revolution in steel processing. By slipping a piece of tissue paper through a model of an open coil we show how the gases get to the complete surface of the coil at once. This makes possible the exciting process of gas alloying by which carbon or nitrogen can be added or removed during the annealing operation. Called the most revolutionary advance in steel processing in our generation, its potential is unlimited. You can get complete data by calling in your Lee Wilson sales engineer or by writing direct.

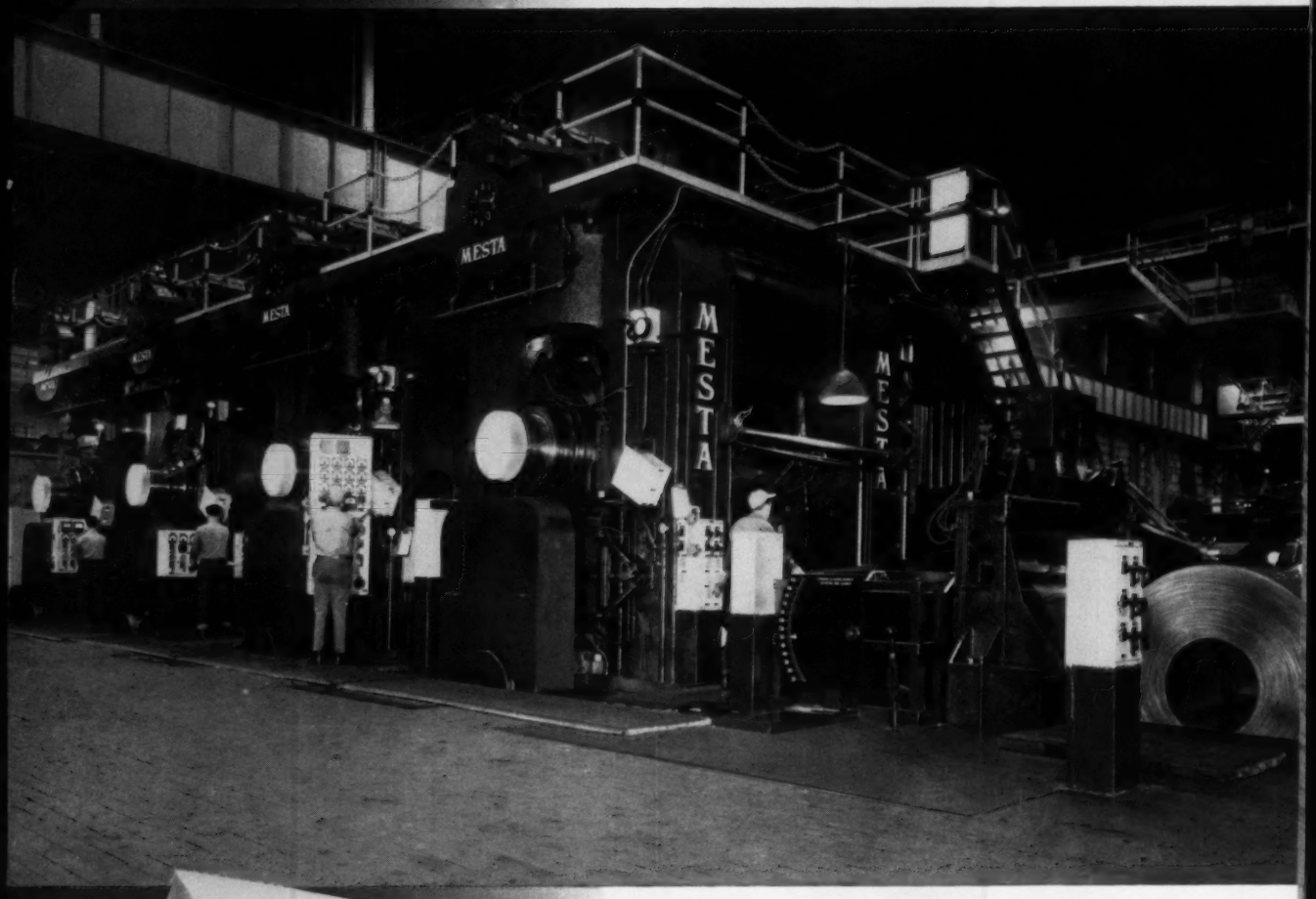
Lee Wilson* ENGINEERING COMPANY, INC.

20005 LAKE ROAD • CLEVELAND 16, OHIO

HIGH PRODUCTION ANNEALING SYSTEMS MAKE THE BEST METALS BETTER

* ORIGINATORS AND LEADING PRODUCERS OF OPEN COIL AND SINGLE STACK FURNACES

HIGH SPEED COLD MILLS



Designed and Built by MESTA

MESTA 80"
Four-High, Four-Stand
Tandem Cold Mill
for Rolling Wide Strip.

Designers and Builders of Complete Steel Plants

MESTA MACHINE COMPANY

PITTSBURGH, PENNSYLVANIA